DIESEL and GAS TURBINE PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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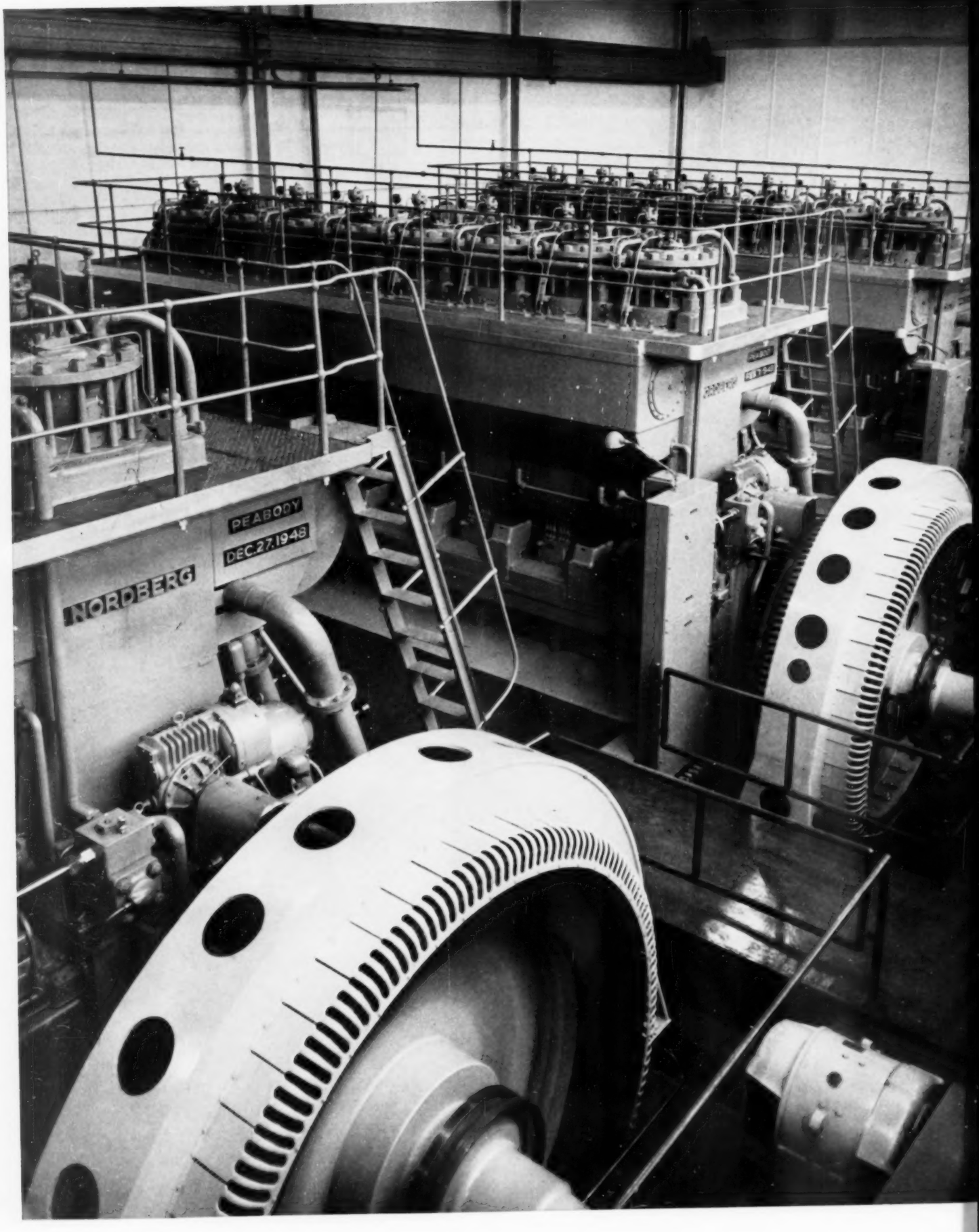
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PEABODY
DEC. 27. 1948

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but spare the horses

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Texaco Ursa Oil prevents harmful deposits in diesel, gas and dual-fuel engines. It keeps rings and valves free for full compression and complete combustion . . . and it filters beautifully.

This is what Texaco customers claim, and you can see there is a significant number of them:

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There is a complete line of Texaco Ursa Oils to meet the requirements of every diesel, gas and dual-fuel engine—regardless of make or model. A Texaco representative will be glad to suggest the one designed to keep your power output up, maintenance costs at a minimum.

Call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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Harrison-cooled GM Twin Diesel stays on the job 6½ years with no down time

Harrison provides endurance with assurance! This GM Twin Diesel drilled for oil on a 24-hour-a-day schedule for more than six years with no down time. And Harrison handled the heat every minute! This is typical of the rugged, trouble-free performance you can expect from Harrison heat exchangers. Harrison's 47 years' experience in the manufacture of heat-control products is your assurance of a top-quality product. If you have a cooling problem, look to Harrison for the answer.

HARRISON HEAT EXCHANGERS

Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered to provide the optimum in cooling efficiency.

HARRISON

GM

FORWARD FROM SIXTY

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FRONT COVER ILLUSTRATION

A new Peterbuilt on the highway with 262 hp Model NTO-6-B Cummins Turbodiesel pulling tanks with a total capacity of 6400 gallons. The rig belongs to Newhall Refining Company of Newhall, California.
Photo Courtesy Cummins Service & Sales, Los Angeles.

KENWORTH'S *new mountain movers feature* FULLER *Transmissions*

Probably the largest rear-dump semi being built today, Kenworth's 42′ 2½″ rock and ore mover is equipped with a Fuller heavy duty 4-speed Transmission.

The 228,000 lb. gvw Kenworth 803-B is designed to haul top payloads profitably over varied terrain. It is powered by a single 12-cylinder diesel engine, offered in either the 400 or 600 hp range. In the 400 hp version, illustrated, a Fuller 4-speed 4-MS-1440 Transmission with CO-11,500 Twin Disc Torque Converter delivers power efficiently and effectively from the powerful Cummins NHV series engine. These heavy-duty Fuller Transmissions provide the right gear ratios to apply the power profitably.

More than 100 different transmission models are available for rubber-tired equipment from 100 to 600 hp, 330 to 1550 cubic inch engines. Check with your truck manufacturer or write Fuller for the right transmission for *your* job.

FULLER

Fuller

TRANSMISSIONS

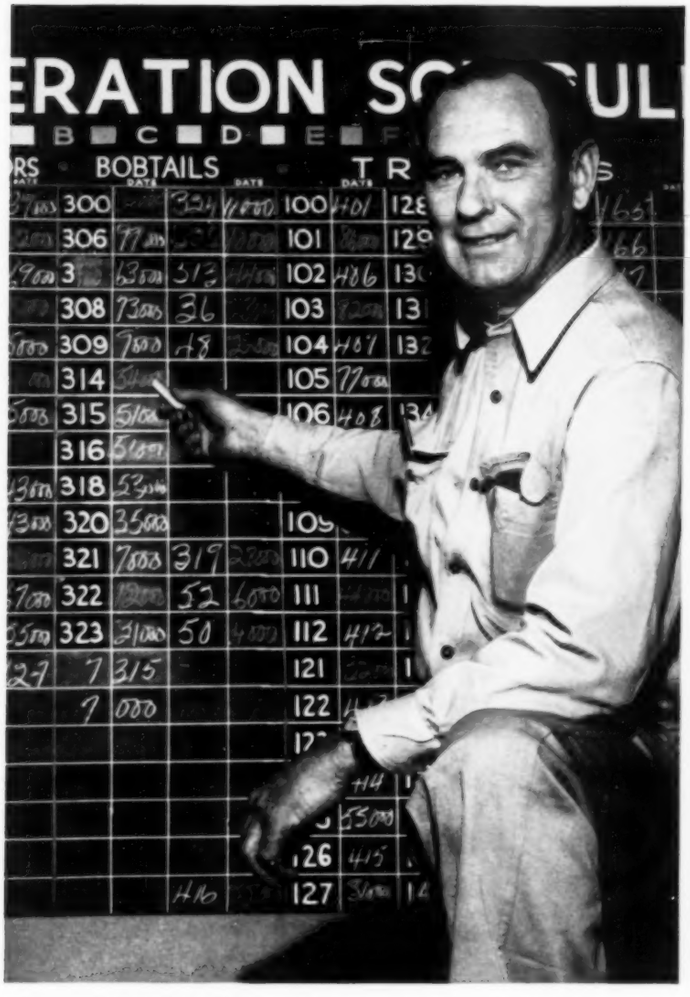
FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich. Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest. Dist. Office, Tulsa 3, Okla.

ENGINEER'S FIELD REPORT

PRODUCT **RPM DELO Oil**

FIRM **STERLING TRANSIT CO.**
Montebello, California

350,000 miles on RPM DELO before rebuilding



Using RPM DELO Oil, Sterling Transit Co.'s 15 diesel tractors run an average of 250,000 miles before overhaul. "In fact, we get 350,000 to 400,000 miles out of them before engines are removed for rebuilding," reports Maintenance Manager Bill Schuster (above). "Regular oil changes are an important part of our preventive maintenance program. This color-coded chart indicates the mileage and condition of any unit in our 82-truck fleet...and these records show that RPM DELO Oil is doing a good job."

LUBRICATING OILS RPM DELO

TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

800-mile round trip between Oakland and Los Angeles is regular run for firm's big Kenworths and Internationals. Mr. Schuster makes frequent dipstick checks (above), reports make-up RPM DELO Oil for trip averages only 5 quarts. Older trucks use cleanable filters; newer units, replaceable cartridges. All use RPM DELO Oil exclusively.

Why RPM DELO Oils reduce wear—prolong engine life

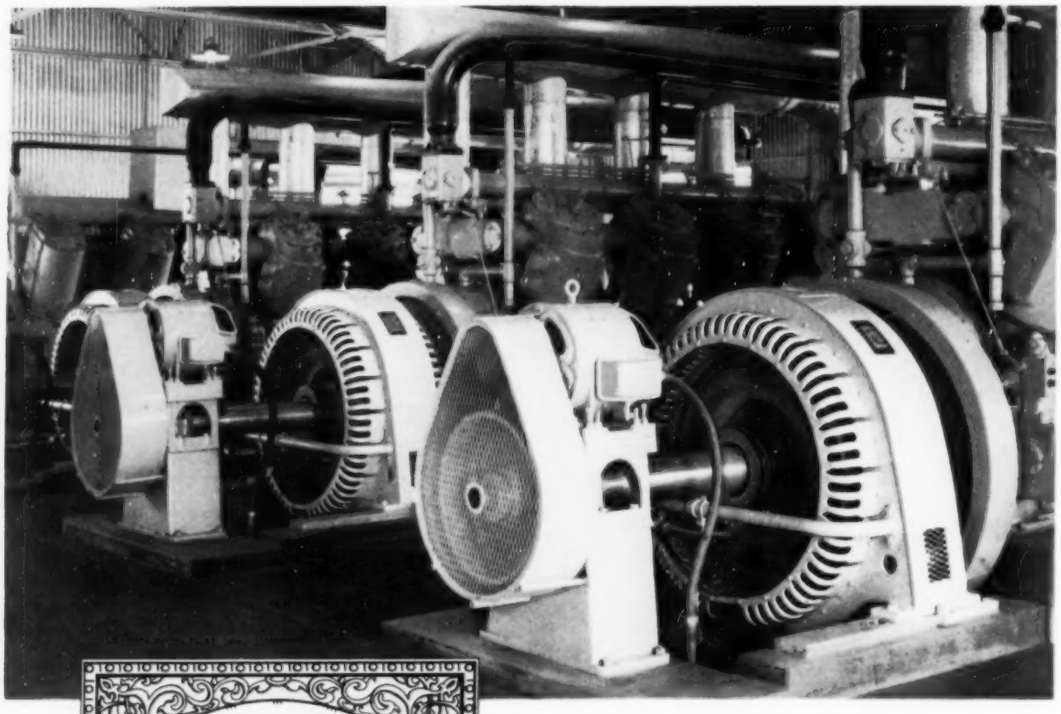
- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.

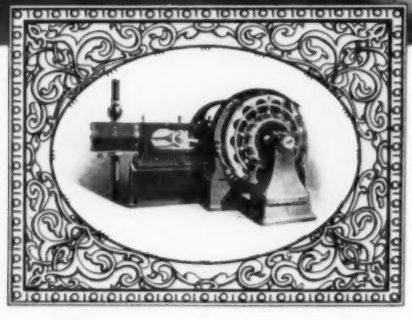
For More Information or the name of your nearest distributor, write or call any of the companies listed.

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Elliott Generators...

"product of 60 years' experience"





this 1892 steam engine generator was the forerunner of today's Elliott low-speed generators

Machines similar to this generator built by the Ridgway Plant of Elliott Company are still in service today.

designed and built for... efficiency and economy

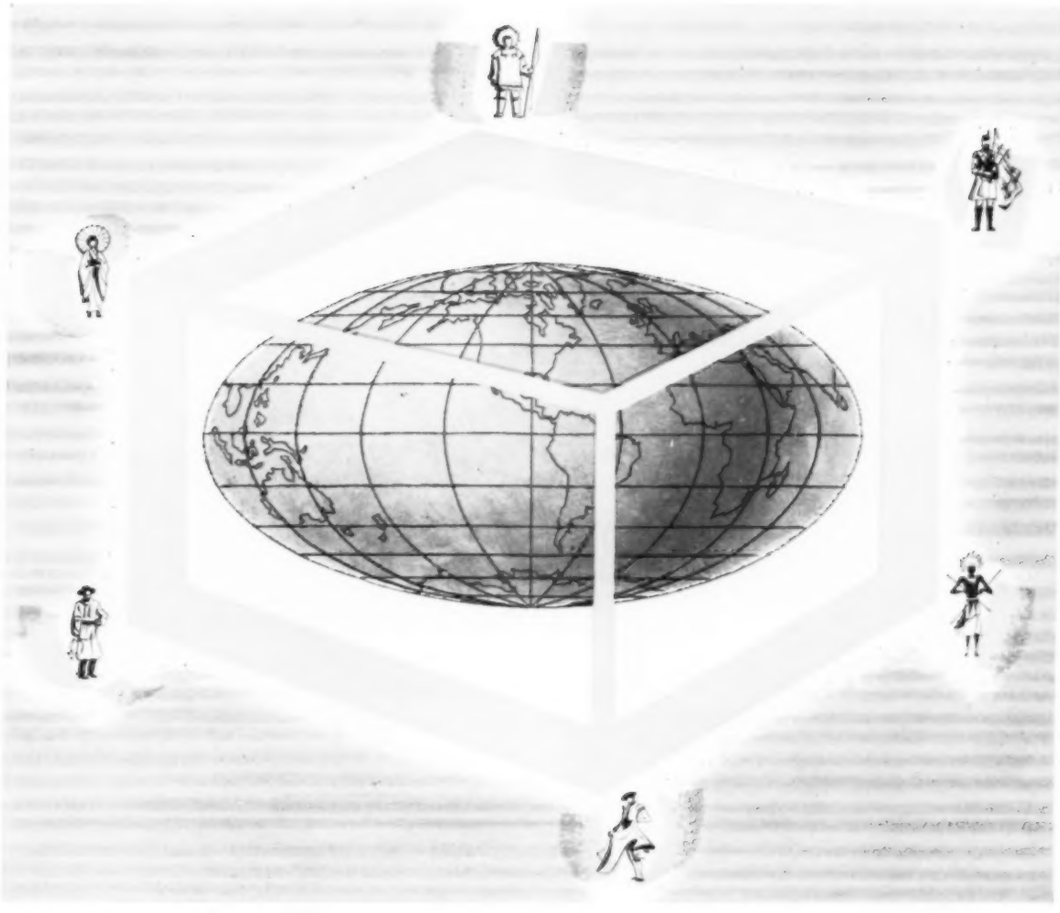
For more than 60 years—since the first low-speed steam engine generator was built in 1892—Elliott has been a leader in designing and building low-speed generators. They have been renowned for extra strength, high efficiency, extra long life and low maintenance.

Typical of today's modern, neat-appearing Elliott machines are the three Elliott 280-kw, 400-rpm, gas-engine-driven generators above, which serve a natural gasoline plant in Texas. Exciters, mounted on outboard bearings, are V-belt driven. Stator frames and rotor spiders are made of electrically welded fabricated steel. Windings consist of the finest insulation materials, mica-wrapped at vulnerable points, and have extra bracing. Easy accessibility for routine cleaning and maintenance is another advantage.

Bulletin PB-2000 gives full details. Write Elliott Company, Ridgway Plant, Ridgway, Pa.

Elliott FABRI-STEEL **ELLIOTT Company** RG-5

Steam Turbines • Motors • Generators • Deaerating Heaters • Ejectors • Condensers • Compressors • Turbochargers • Tube Cleaners • Strainers



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Shell Dromus Oil—cutting oils for high-production metalworking

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

Rimula® Oil reduces cylinder and bearing wear caused by acidic combustion products that are increased by low jacket temperatures. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods...effecting worth-while savings in labor and parts.

Rimula Oil, regarded in the U.S.A. by manufacturers and operators as an indispensable accessory to heavy-duty vehicular operation, is available to your customers abroad under the same brand. For full information, write: Shell Oil Company, 50 West 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Calif.

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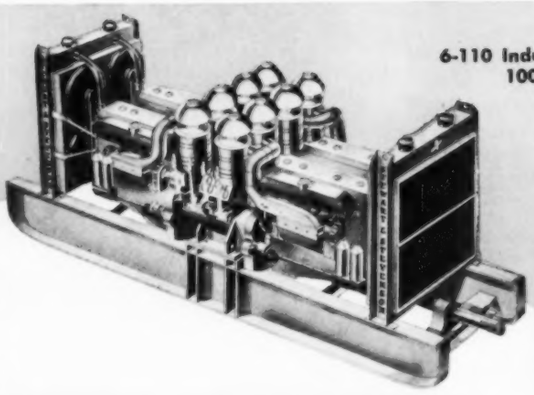
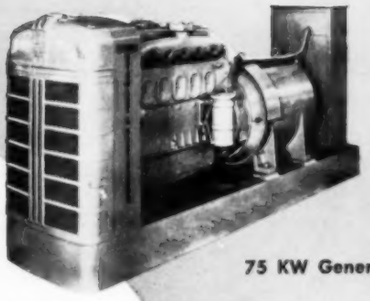
SHELL

UNITIZED POWER

FOR EVERY INDUSTRY



6-110 Industrial Quad
1000 HP



75 KW Generator Set

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Whatever your power needs, whatever the application, Stewart & Stevenson can help you if you have a power problem.

COMPLETE FACILITIES ALL UNDER ONE ROOF:

- Engineering
- Design and layout
- Complete installations
- Parts and service

FOR FULL INFORMATION, PHONE, WRITE OR WIRE . . .

All units can be furnished with either diesel engines or gas, gasoline or butane engines.

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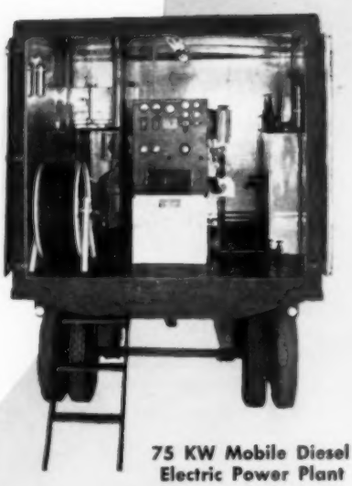
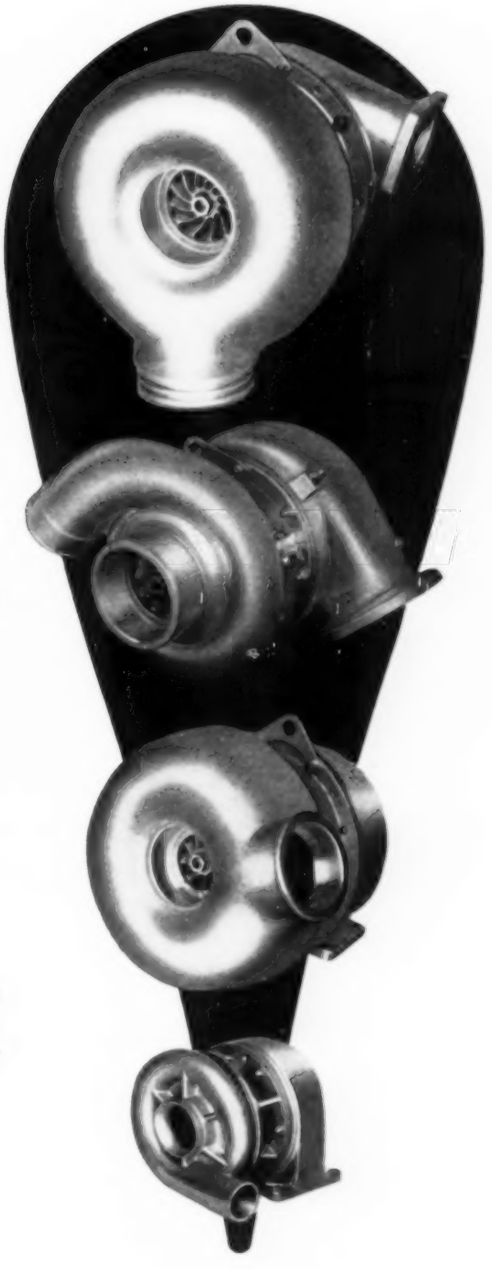


75 KW Mobile Diesel Electric Power Plant

Combination Oil Field Rig Lighting, Welding and Auxiliary Unit

THE WORLD'S LARGEST DISTRIBUTOR OF GM DIESEL ENGINES

AIRESEARCH TURBOCHARGERS ANSWER "YES!" TO...



increased power?

Your engine's output can be raised up to 100%, depending on its design and application. Incorporating the most efficient turbine wheels in the industry, AiResearch turbochargers can give sea-level performance up to 12,000 feet.

lower specific fuel consumption?

The turbocharger improves engine combustion, resulting in important fuel saving per horsepower even with greatly increased engine power output.

lower engine thermal loading?

Efficient compressor wheel design holds heat-producing turbulence to a minimum, providing a smooth flow of compressed air to the engine. AiResearch turbochargers are also air-cooled, eliminating the need for complicated plumbing.

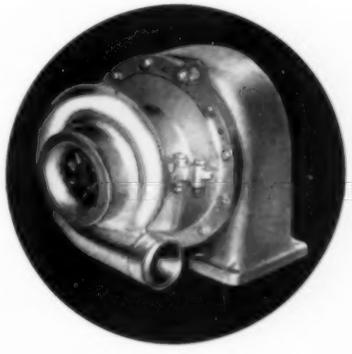
less noise and smoke?

Engine noise level is greatly decreased. Smoking is often completely eliminated.

reliability and durability?

Excellent reports on more than 13,000 AiResearch units at work in the field emphasize these qualities. AiResearch turbochargers require no attention between normal engine overhaul periods.

Your inquiries are invited.



THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

Constructed by Raymond-De Long

WHITE SUPERIOR DIESELS AND BENDIX INJECTION EQUIPMENT ON DUTY AT AMERICA'S FIRST LINE OF DEFENSE!

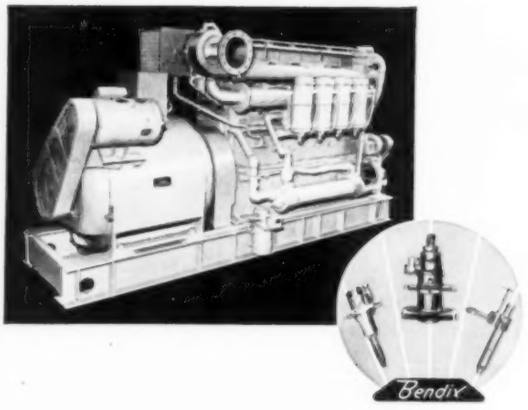
Today, out in the broad Atlantic stands our country's first line of defense—the Texas Tower. Specially trained Air Force personnel on these early-warning radar stations off the East Coast maintain a round-the-clock vigil, ready and alert to sound the warning that will start our air defense into action at the first approach of the enemy.

Here, at this vitally important outpost, equipment must be ready to function at a moment's notice. Here dependable performance over long periods is truly a must.

White Superior Diesel engines with Bendix* Fuel Injection equipment meet every requirement in generating the power for vital radar operation and also for the radio, communication, heating, lighting and ventilating equipment aboard additional towers.

It seems entirely logical that Bendix Fuel Injection equipment should be selected for this important job for Bendix is invariably the choice for fuel injection equipment when there can be no compromise with quality.

*REG. U. S. PAT. OFF.



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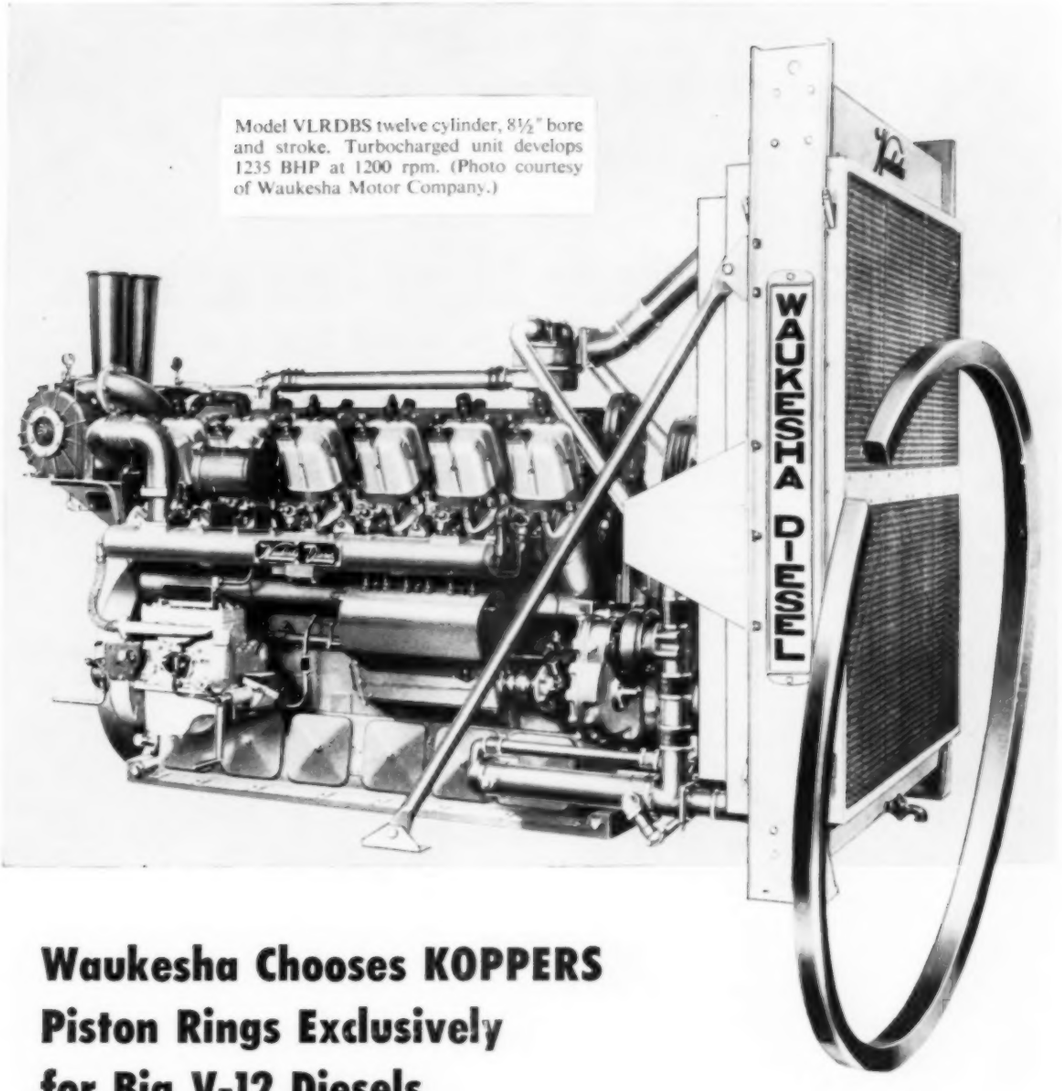

Model VLRDBS twelve cylinder, 8½" bore and stroke. Turbocharged unit develops 1235 BHP at 1200 rpm. (Photo courtesy of Waukesha Motor Company.)

Waukesha Chooses KOPPERS Piston Rings Exclusively for Big V-12 Diesels

Waukesha's VLRDBS supercharged diesels are perfectly suited for applications such as oil rigs, excavators and tugboats where a surge of reserve power is essential for emergency and overload demands.

This recent series of diesels manufactured by the Waukesha Motor Company, of Waukesha, Wisconsin, is designed to develop tremendous power under the severest operating conditions . . . the kind of power that puts a premium on piston ring performance. Waukesha has selected Koppers Piston Rings as have other manufacturers who must be certain of reliable component performance.

This dependability is yours when you rely on Koppers with their complete range of materials . . . wide selection of types and sizes . . . rigid quality control and careful inspection. These factors contribute to Koppers unchallenged leadership in producing the finest piston and sealing rings for industry.

Instead of undergoing needless expense in solving ring problems, take advantage of Koppers experience, research facilities and craftsmanship. Write for information today. KOPPERS COMPANY, INC., Piston Ring and Seal Dept., 1404 Hamburg St., Baltimore 3, Md.

★ **KOPPERS DEPENDABLE RINGS CONTRIBUTE TO WAUKESHA'S RELIABLE PERFORMANCE UNDER THE MOST RUGGED CONDITIONS.**

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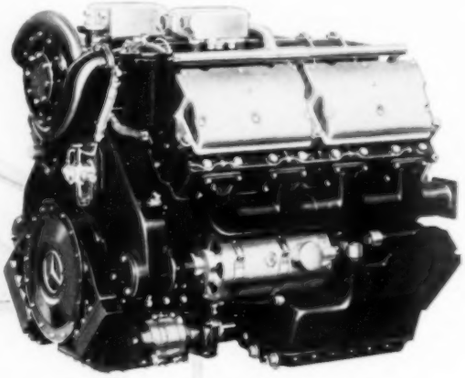
AMERICAN HAMMERED
Industrial Piston Rings
Engineered Products Sold with ***Service***

EFFORTLESS PERFORMANCE
FROM START TO FINISH

MERCEDES-BENZ
DIESEL ENGINES

Mercedes-Benz diesel engines are powered to meet the toughest requirements of the petroleum industry—both inshore and offshore operations . . . They are designed and built to provide low-cost power for rugged, deep drilling, pumping, electrical generating and innumerable other specialized applications . . . High horsepower to weight ratio and compact size permit room for other rig equipment . . . Their unusually long engine life and exclusive Mercedes-Benz design allow continuous operation under extreme climatic conditions . . . Your Mercedes-Benz dealer can supply you with complete information on the full range of models from 36 to 3000 h.p.



MODEL MB 837 Aa

Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Supercharged, up to 3000 h.p.

UTICA DIVISION
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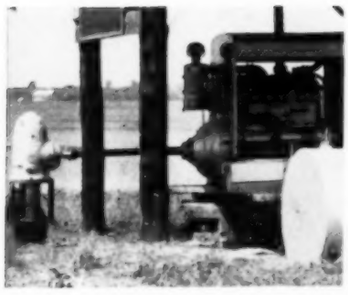
CORPORATION • UTICA, MICHIGAN



For the best deal... go to the best dealer

When you look for a new diesel power unit, look for *more* than just the *best cash deal*. Look for the *best dealer*, too . . . one who will design, install and *stand behind* the complete power package.

The *best* dealer has the experience and know-how necessary for a *successful combination* of components to make his unit work the most efficiently and economically *for you*.

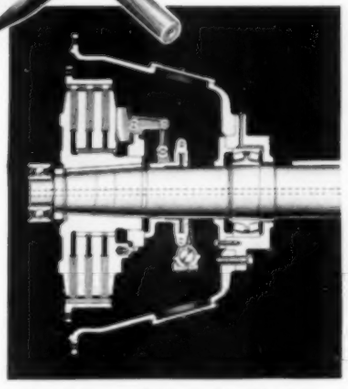
In selecting these components, he is careful to weigh all factors and advantages of one company over another. In transmitting power, for example, the *best* dealer invariably chooses Twin Disc Friction Power Take-Offs.

Many times particular power units —such as those manufactured by Ajax, Allis-Chalmers, Caterpillar, Climax, Continental, Cummins, Hercules, Hall-Scott, International, LeRoi, Minneapolis-Moline, Murphy Deisel, P&H, Waukesha, Wisconsin and Witte — are already equipped with Twin Disc Friction Power Take-Offs, selected by the engine builder to *assure* dependable, economical power transmission.

Both engine manufacturers and engine and equipment dealers have learned, through experience, that Twin Disc Friction Power Take-Offs offer the greatest protection against failure between power unit and driven equipment.

Twin Disc offers a complete range of sizes, suitable for all internal combustion engine applications up to 600 hp—including triple-plate, 14″ to 21″; double-plate, 11½″ to 24″; single-plate, 6½″ to 24″.

For specific details on Twin Disc Friction Power Take-Offs, request Bulletin 308.



Twin Disc's new SP Power Take-Offs feature: counter-balanced engaging linkage; positive-type clutch engagement; pilot bearing with double grease shield; clutch plates with maximum friction area; spherical roller bearing; heavy-duty, oversize output shaft; easily adjusted clutch through pin and adjusting ring.

TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

Michigan-Ohio News

By Jim Brown

RICHARD Hamlin, a gravel hauler from South Lyons, Michigan, recently had a model NTO-6-B 262 hp Cummins Diesel installed in his LJ Mack tractor. The installation was done by Cummins Diesel Michigan Inc.

RICHTER Transfer Co. of Cincinnati recently purchased three model DW-21 Caterpillar scrapers powered by Caterpillar model D-337 turbocharged diesel engines. The Richter Transfer Co. will use these units on a sub-contract for earth moving in the construction of the Norwood Lateral Highway, a federal aid project. The Highway Equipment Company made the sale.

LESLIE Brothers Lumber Company of Holcomb, W. Va. recently purchased a GM model 6028-C Detroit diesel to power their saw mill. Sale was by Ray C. Call, Inc., of Steubenville, Ohio.

R. C. DURR, a general contractor of Walton, Kentucky recently purchased a Caterpillar Diesel model D-311 with which he is using to repower a model TL-20 Thew-Lorain Truck Crane. The Highway Equipment Company of Cincinnati, representing Caterpillar, made the sale.

A PETTIBONE Mulliken Swing Loader complete with 2½ yd bucket, 4 wheel drive, 4 wheel steering, crane hook, and powered by a GM model 4-51 Detroit Diesel with Allison Torque Converter recently was delivered to the City of River Rouge. Cyril J. Burke, Inc., of Detroit made the sale.

MARSHALL Mining Co., of North Lima, Ohio has installed a new model HRFB Cummins Diesel in their Lorain 75 shovel. The new Cummins was purchased from Cummins Diesel of Northern Ohio, Inc.

A CATERPILLAR model D-337 turbocharged diesel was purchased from the Highway Equipment Company of Cincinnati by Mr. Lloyd Wildman of Cedarville, Ohio. The new engine will power a Bearcat Hammermill used to process hay and grain for a pellet mill on Mr. Wildman's farm.

PENINSULAR Diesel Inc. of Detroit has recently delivered a model 6055C GM Detroit diesel to Lipsett Steel Products, River Rouge, Mich. for installation in an Industrial Brownhoist Locomotive crane.

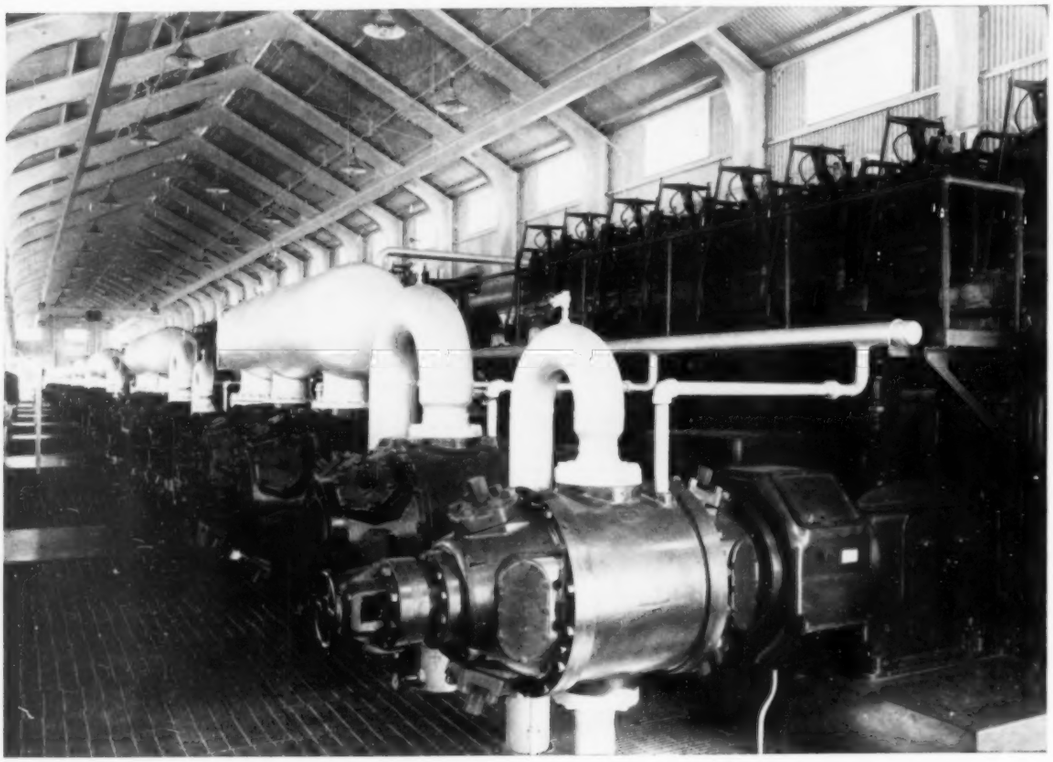
THE HARRY Miller Excavating Company of Suffield, Ohio has accepted delivery on a Michigan 180 Tractor Dozer powered by a Cummins turbo-charged diesel engine model JT6B1 and equipped with compactor wheels. Mr. Miller reports that this machine is giving him excellent service in both 'dozing and compacting on State Route 224, near Wadsworth, Ohio. Distributor is J. J. Turner, Inc. of Cleveland, Ohio.

THE HIGHWAY Equipment Company of Cincinnati has sold a Caterpillar D-375 turbocharged diesel electric Set of 225 kw capacity to Walter C. Follmer of Hamilton, Ohio. The new Cat will be used to power a Hetherington-Berner Portable 5000 Asphalt Plant.

BILL Cooper Coal Co. of Rupert, W. Va. has accepted delivery on a GM model 6030-C Detroit diesel powering a 100 kw Imperial dc generator set. This unit will be used to supply power for coal mining operations, and was purchased from Ray C. Call, Inc. of Steubenville, Ohio.

PAUL T. TIMKO of Toronto, Ohio has a new 175 hp model JT-6-B Cummins diesel which will be used to power his Brockway model 154W truck. Sale was made by Cummins Diesel of Northern Ohio, Inc.

Look to COOK for Better Rings!



Cook packing and rings help keep compressors humming!

A well-known oil-producing company keeps this big lineup of Clark Bros. compressors running night and day in a West Texas gasoline plant. Keeps them running smoothly and efficiently, too — *thanks in good measure to C. Lee Cook packing and piston rings!*

Whatever type industrial equipment you operate, if it uses piston rings and packing, chances are good that it was Cook-equipped *when it was built.* That's why your best bet for continued trouble-free performance is to *keep it Cook-equipped.*

Your nearby C. Lee Cook representative will be glad to give you all the facts about precision-engineered Cook products. Why not talk with him soon? C. Lee Cook Company, 940 South 8th Street, Louisville 3, Kentucky.

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A MODEL D-342 Caterpillar Marine Engine equipped with a Twin Disc reverse and reduction gear in a ratio of 1.96:1, was recently acquired by Cincinnati Marine Service, Inc., for installation in their tug *J. L. Beatty*. This will be the sixth Cat engine owned by this company. The Highway Equipment Company handled the sale.

EARLE Equipment Company of Detroit has recently delivered a model HD21G Allis Chalmers Tractomotive Loader equipped with a 4 yd bucket to Great Lakes Steel in Ecourse, Michigan.

PENINSULAR Diesel Inc. of Detroit has installed a GM model 3080 Detroit Diesel in a Pettibone Carry-Lift for the Watervliet Paper Co. in Watervliet, Michigan.

MACK Trucks Inc. of Dearborn, Michigan announce that they have several orders on their model N61T cab-over-engine Mack trucks. These new forward tilt cab trucks recently announced in the trade press will be powered by model END 673 Mack Diesels.

CENTRAL Asphalt Paving Company of Charleston, W. Va. has accepted delivery on a GM model 62406-RD Detroit diesel engine for their Cedar Rapids Rock Crusher. Sale was made by Ray C. Call, Inc. of Steubenville, Ohio.

MARENS-Fader Equipment Co., distributors of Bay City shovels in Detroit, has accepted delivery on a model H-6-BI Cummins diesel for installation in a Bay City model 65 1¼ yd crane. The new Cummins was ordered from Cummins Diesel Michigan Inc. of Dearborn, Mich.

CYRIL J. Burke Inc. of Detroit has delivered a model 41 Northwest dragline powered by a model 21 Murphy diesel to Mr. William Muehlenbeck of Saginaw, Michigan.

Portable Ignition Switch

P & G No-Key Portable Ignition Switch, a push-button switch that attaches under the hood to start, run and stop engines without ignition keys, is now being marketed by the P & G Manufacturing Company of Portland, Oregon. A time and labor saver, the No-Key Switch is useful to mechanics for starting, running and stopping the engine while working under the hood, and for either intermittent or continuous cranking of the engine without firing. (During continuous cranking, both hands are free for compression checks and other work requiring two hands.) This "No-Key" Switch also works on farm equipment, aircraft, industrial equipment, marine craft, trucks and buses. The lightweight, flexible device features a new type single button control. All ignition functions may be performed from any position while working beside, over, or directly under the engine. This is particularly helpful when servicing on an overhead hoist. Without lowering the hoist or entering the car, the operator may start, run and stop the engine to check for oil, water or exhaust leaks. This tool also locates blown fuses and broken circuits, checks electrical equipment, bypasses any switch, and may be used with an ammeter for checking generators and voltage regulators. All elements of the No-Key Portable Ignition Switch are fuse protected against accidental short circuits. Price is $6.95. Inquiries should be sent to P & G Manufacturing Company, 305 N. E. Russell Street, Portland 12, Oregon.

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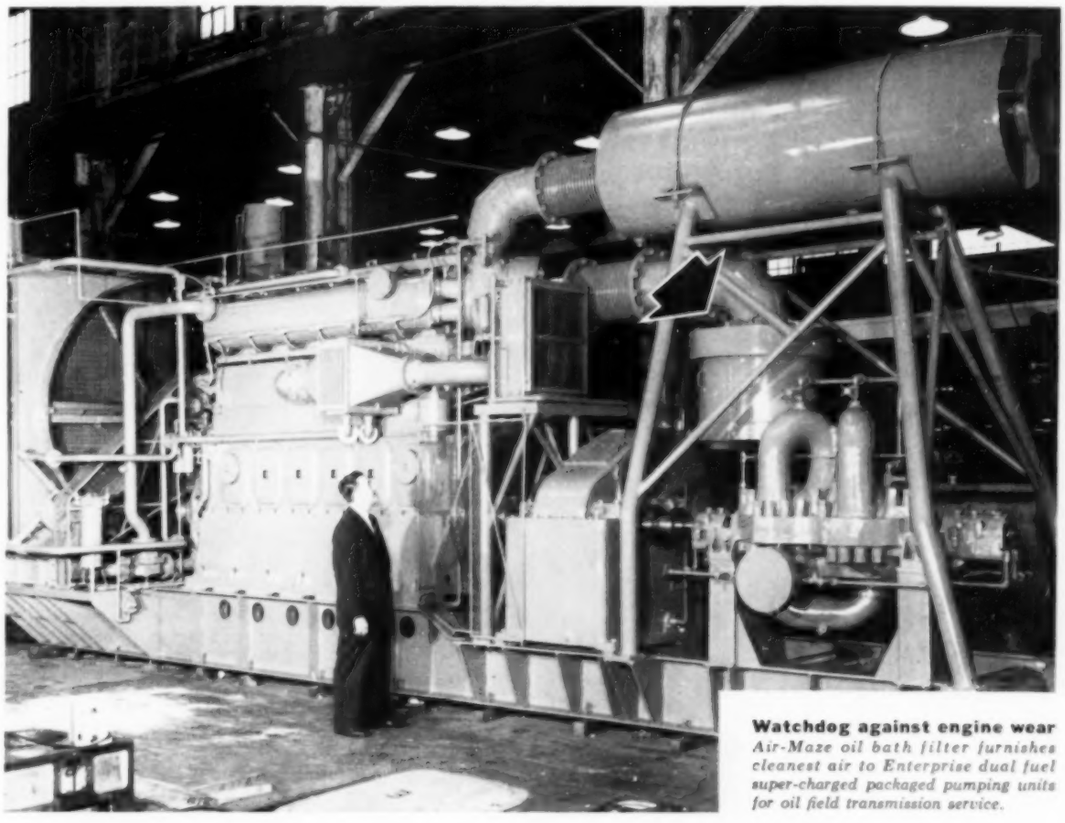
NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, Cal.



Watchdog against engine wear
Air-Maze oil bath filter furnishes cleanest air to Enterprise dual fuel super-charged packaged pumping units for oil field transmission service.

CUTTING ENGINE WEAR STARTS WITH AIR-MAZE FILTERS

When it comes to cutting down wear on vital engine parts, efficient filtering of intake air is a primary factor. That's why Air-Maze filter engineers are your best assurance to peak operating efficiency with minimum maintenance on whatever type or size of power equipment you build or operate. From a complete line of filters they can furnish you:

Air-Maze Oil Bath Filters to provide positive protection against harmful dirt particles entering the engine intake. The filters are simple to install. Service is simple since filters installed 20 years ago are still operating without a replacement part.

Air-Maze Dry Filters to provide fine particle filtration for engines, compressors and blowers. On services where vibration is present, these filters are virtually self-cleaning to retard build-up in pressure drop.

For large volumes of air and low pressure drops —Automaze self-cleaning curtain and LPD cylindrical oil-bath filters.

For smaller volumes of air on mobile equipment —stack-type oil bath filters.

For adequate impingement filtration where dirt loads are low and low initial cost is a factor— Multimaze and DH panel assemblies.

For removal of sub-micronic dust— Electromaze electronic air cleaner. Write now for the All-Line Catalog. THE AIR-MAZE CORPORATION, Cleveland 28, Ohio.

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Diesel All Around The World

By F. Hal Higgins

SOVIET UNION, Canada and Australia had sharp drops in crop output in the 1956-57 years, but world production for 1957-58 is expected to equal the record year before, says U.S. Department Of Agriculture in its recent *The World Agricultural Situation 1958*. Rice, cotton and wheat crops have smaller carryover stocks in exporting countries as a result of record world trade in agricultural products. These three crops are all highly dieselized in California, and are trending in that direction in the other states that produce wheat and cotton.

NUFFIELD diesel tractors and engines built by Morris Motors Ltd., Agricultural Division, in England, announces its tractor line for 1958 with BMC diesel engines. Their Universal tractor rates 31.1 hp at the drawbar on diesel, 30.8 on vaporizing oil, and 34.2 on gasoline at 1,400 rpm. With the Morris Motors, Ltd., all over the globe with its lines of automobiles, the Nuffield tractors are starting to get to Canada and should appear in U.S. farming areas soon.

SHRINK Farming Costs—Make Bigger Profits is Deere & Co.'s 1958 pitch for that company's improved 820 diesel tractor. Bigger farms and equipment for the one skilled worker on a tractor that can do the work of two smaller tractors with operators is the trend Deere is riding.

CONTINENTAL diesel engines are powering the first combined harvesters to be manufactured in Argentina, says Manager A. S. Bolthouse of Continental Motors Corporation Export Division.

THIRTY tractors went through the Nebraska test in 1957, and 13 of them were diesels. Two foreign tractors, one from Germany and the other from France, were in the diesel list. Five Internationals, one Case, 1 Wagner, 1 John Deere, 1 Oliver, 1 Allis-Chalmers, and 1 Eimco. The Eimco had GM engine, and the Wagner was powered by a Cummins. The Someca had a Fiat and the Unimog a Mercedes-Benz diesel. International's 350 had Continental diesels in both its Utility and Farmall models. Oliver powered its OC-15 with a Hercules. Case's 301 was also powered by a Continental diesel. The Nebraska test table just issued covers 127 tests and includes data on all tractors reported by their manufacturers as being on the market Jan. 1, 1958.

TWO wheel tractors in tandem combined as a single unit will pull up to 45% more at the drawbar than the same two tractors operated as separate units, according to experiments by Ford engineers at two U.S. state colleges. Front wheels of both tractors are removed and special linkage system used to connect and provide a pivot point between the two tractors. One man operated both from the seat of the rear tractor. More experiments are being carried out to learn the practical possibilities.

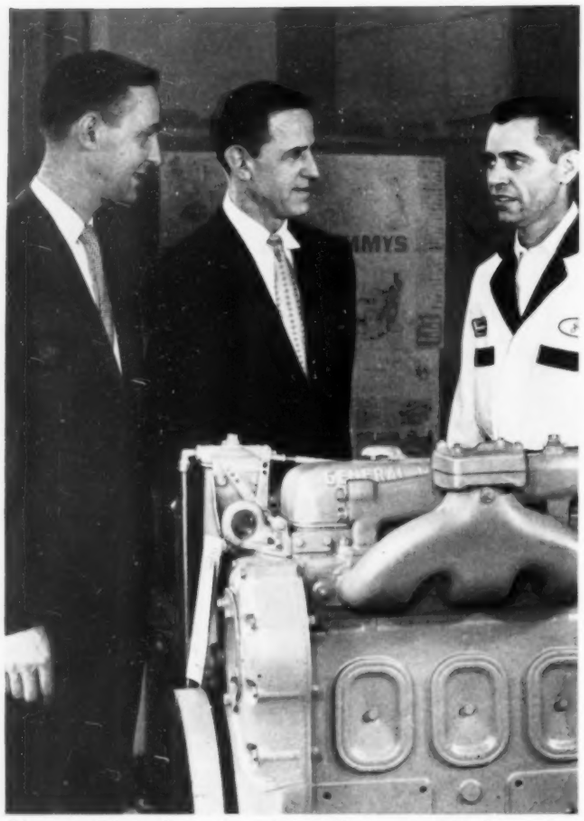
A SOIL pulverizing machine that solves the age old cane stubble problem in sugar cane fields has been developed at the Louisiana Agricultural Experiment station. Not yet in production, engineers believe the machine can be built for about $2,000. It is hauled behind a diesel tractor and should help cut costs in sugar production.

THE German Class SF55 combined harvester is being powered by a 4 cylinder British Perkins 60 hp diesel as choice of buyer who wants diesel.

OLIVER'S OC-15 powered by a Hercules diesel DRXC made its debut on the California front on Jan. 31 when it was shown to western dealers, Oliver com-

Three Managers of Detroit's Peninsular Diesel, Inc., Agree:

"Good service means using factory-recommended tools"



Shown talking sales and service at Peninsular Diesel are, from left to right, Clarke Andrae, Charles Rossow and Joe Lackey.

"Good service is good business," says Clarke Andrae, General Manager of this high-volume GM Diesel distributorship, "and good service means using factory-recommended tools to meet rigid Detroit Diesel specifications."

Adds Sales Manager Charles Rossow, "More and more, good service and service facilities play an important part in diesel sales."

"I couldn't run my service department without the proper tools as recommended by the engine manufacturer." —Joe Lackey, Service Manager.

You'll find that you can turn present GM Diesel service problems into your best salesmen—with Kent-Moore factory-recommended Precision Tools.

There are nearly 200 Kent-Moore Special Service tools for GM Diesel engines, and because every time-saving, labor-saving service kit, gauge and single tool is engineered in cooperation with the engine manufacturer, you can guarantee every job serviced to factory "specs".

See your GM Detroit Diesel Distributor, or write today for your FREE Service Tool Guide listing basic engine tools, and tools for cylinder head, air intake, exhaust and fuel systems, governor and transmission servicing on GM Diesel Series 51, 71 and 110 engines.

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58-D1 ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT

Some typical Kent-Moore Special Service Tools used for factory-recommended GM Diesel service at Peninsular Diesel, Inc., Detroit:

CONNECTING ROD BUSHING REAMER SET

CYLINDER COMPRESSION GAUGE

INJECTOR TUBE SERVICE SET

VALVE SEAT INSERT REMOVER

pany branch officials and their sales and service personnel at a demonstration at Oliver's Be-Ge factory at Gilroy, Calif.

THERMAENIUS, the Swedish combined harvester company, is fitting the Perkins Four 99 (TA) engine into its 256 type self-propelled combine for the 1958 trade. The Perkins diesel has been tested over long periods last year in nine different combined harvesters in Sweden, Great Britain, Germany, Austria and Italy.

DRAYTON Diesels, Ltd. is arranging volume production of two small diesels for agricultural and industrial requirements. The Drayton 34 and 35 models are of 8 and 9 hp, respectively, at 2,000 rpm. Both are single cylinder air-cooled 2-cycle engines.

THE EPPLE Mobile, a new self-propelled combined harvester manufactured by Epple-Buxbaum-Werke of Austria, is powered by Perkins new Four 99 (TA) diesel engine. This new model diesel was shown for the first time at the famous Smithfield show in England just before Christmas.

A FASTER junking rate for farm tractors is suggested by Canadian officials. Average tractor life was around 9 years back in the 1930's, says *Canadian Farm Implements*. Through the war years this life lengthened to 16 years and has dropped back to 10 years since end of war.

LOOKING ahead to 1958 last December, *Farm Implement News* forecast farmer purchases of new and bigger farm implements to meet the demands of higher labor on the farm. The gradual climb of farm income the past two years should continue through 1958, thinks this prognosticator.

AN Allis-Chalmers HD21 with bulldozer has been making a great reputation on Gibbons & Reeds' 7-mile stretch on Highway 99 between Redding and Dunsmuir in the Sacramento Valley. This stretch above Shasta Lake has always been one of the twisting, climbing tough roads of California and is getting its modernization after most of 99 is fast and carefree. For example, two cuts of 157 and 257 ft had over 700,000 yards of material to move.

LeTOURNEAU'S three big logging machines recently introduced are ready to go for 1958 logging business are fully equipped with Timken tapered roller bearings. His high capacity electric logging arch features an in-line arrangement of the diesel electric power plant instead of the cross-line design of his older models. GMC and Cummins power most LeTourneau models.

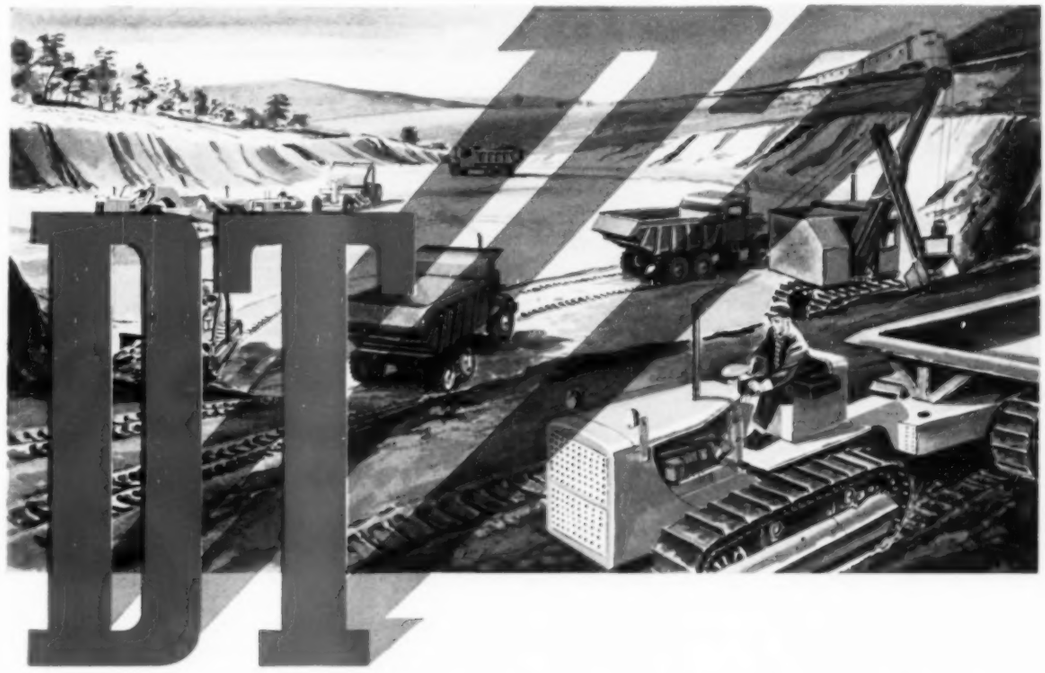
Catalytic Exhaust Purifiers

Exhaust purifiers for oxidizing carbon monoxide, fumes and odors from gasoline, LP-gas and diesel-powered equipment are illustrated and described in a four-page folder just published by Oxy-Catalyst, Inc. Entitled *Exhaust Fumes Are Poison*, the literature gives the technical characteristics and typical elimination data for three types of catalytic purifiers: (1) OCM Catalytic Exhaust Purifier for engines fueled with LP gas or unleaded gas, (2) OCM Dieseler for 4-cycle diesel engines and (3) Oxy-Muffler for engines operating on leaded gasoline.

Copies of *Exhaust Fumes are Poison* are available free on request by writing to Oxy-Catalyst, Inc., Wayne, Pa.

Parts Sales Manager

Promotion of Robert J. Hondlik from assistant manager of parts sales to parts sales manager of Electro-Motive Division of General Motors is announced by Paul R. Turner, director of sales. Mr. Hondlik succeeds Marvin Anderson who has retired. The appointment was effective February 1.



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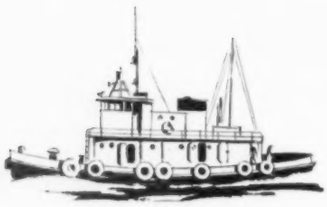
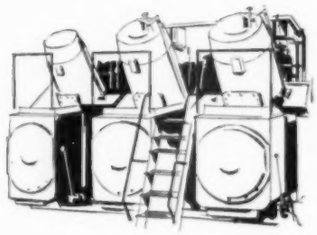
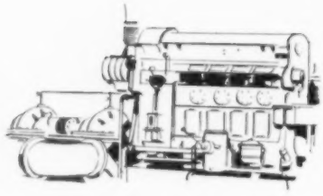


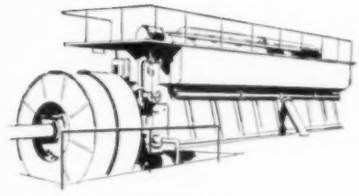
Marine



Engine compressor



Pumping



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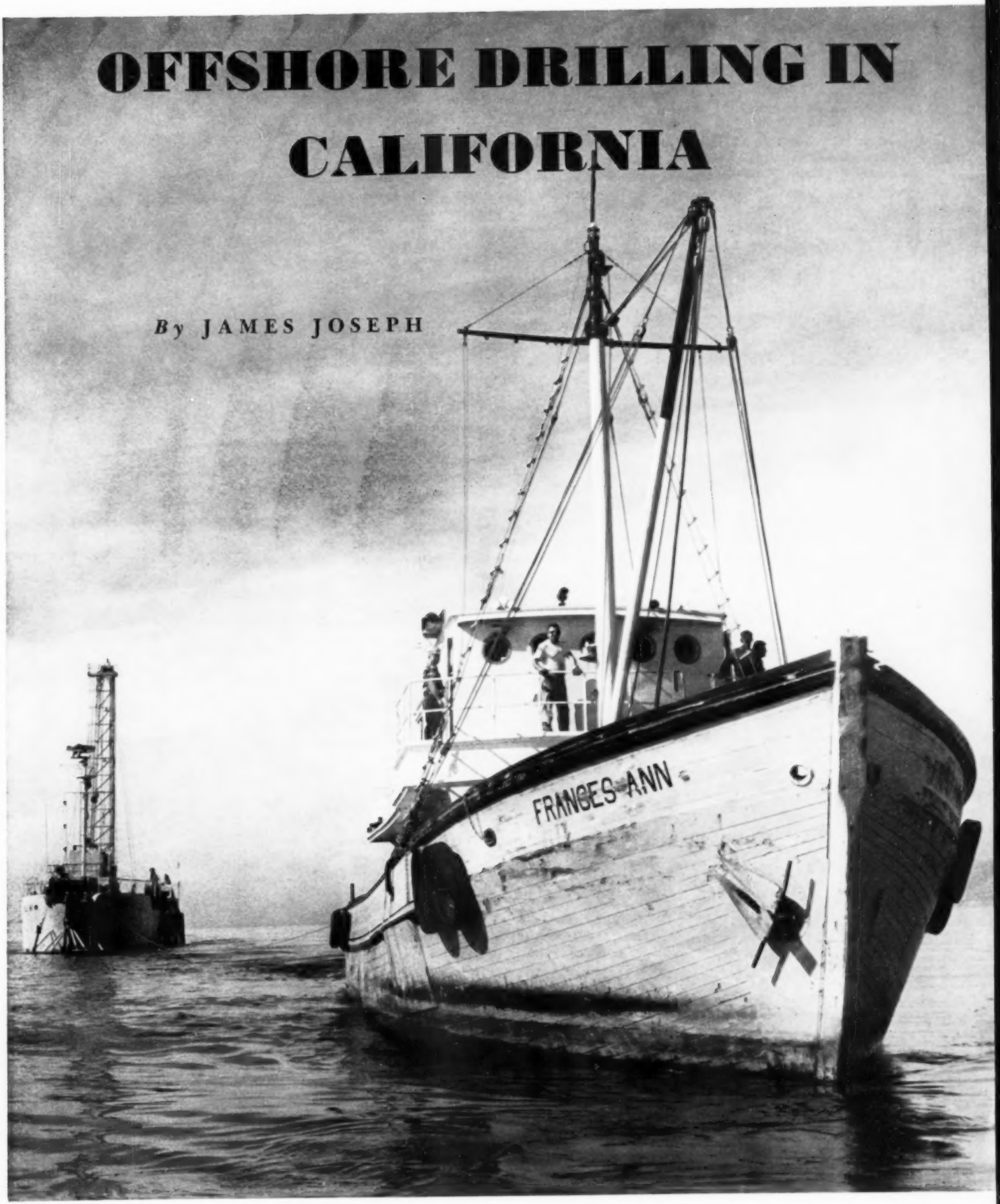
OFFSHORE DRILLING IN CALIFORNIA

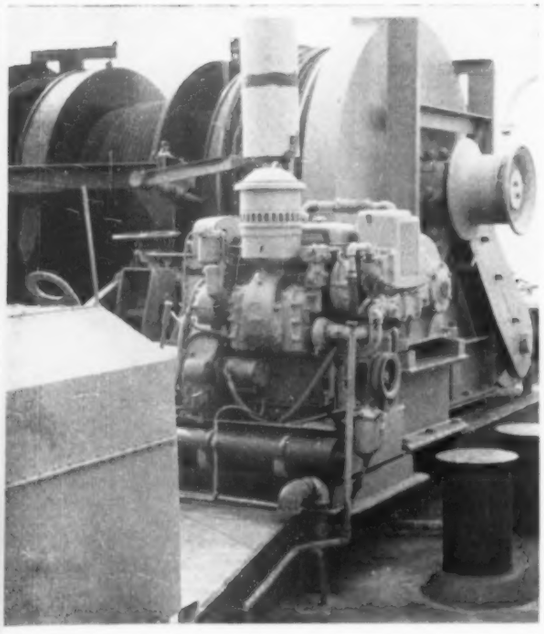
By JAMES JOSEPH



WORKING off the Southern California coast is a first-of-its-kind deepwater exploration barge—the 204-ft converted navy landing craft *Humble SM-1*, Humble Oil and Refining Co.'s unique offshore core-driller which mounts amidships a 75-ft derrick—probing undersea stratas thru a 10-ft diameter well in its keel. Among the first of floating tidelands exploration vessels, it is the first designed for thru-the-keel drilling. Capable of thrusting its drill bit 7500-ft below the ocean's surface, *Humble SM-1* has, since it became operative in October, 1956, cored some 49 test-holes, the deepest 3300-ft, while working ocean depths to 228-ft (this, compared to the far more shallow 75-100-foot operational depths common to tower-mounted derricks along the Texas Gulf coast).

Moreover, *Humble SM-1* is uniquely dieselized, mounting no fewer than nine diesel engines. (1) Two drive the double-drum drilling unit thru torque converters. One of the converters, its second stator modified to reduce the stalled torque ratio to 1.8:1, automatically feeds-out and reels in the drill string, compensating for the ship's roll during rough weather. Counteracting wave action, the torque converter not only continuously feeds out drill line (as the bit bites deeper), but at the same time keeps the drill working, as tho the derrick to which it's tied were as rock-steady as a dry-land rig. (2) three diesels installed in what was formerly the ship's engine room, drive mud pump thru torque converters. Two of the engines drive a mud pump, while the other, thru a similar power hook-up, powers another pump. (3) two more diesels housed aft of the pump rooms, power two 100 kw generators—supplying the floating core-driller with 440 volts, reduced thru transformers to 220 and 110 volts. One of the generator sets acts as standby. (4) the eighth and ninth diesels, one at the bow, the other at the stern, hydramatically drive 3-drum wireline windlasses—which tend the barge's 5000-lb anchors. Normally, four mooring lines steady the barge, an anchor set at each quarter (approximately 45-degrees from the ship's center line), and at 1200-ft distance.

Diesel engine used to drive port and starboard bow anchor windlasses. This engine drives through a hydramatic transmission and provides sufficient power to break-out a 5,000 lb anchor and haul it aboard.



Because the *Humble SM-1*, stripped of its motive power, is essentially a sea-going barge, it must be towed drill-location to drill-location—this, by the 102-ft cargo vessel *Frances Ann*, powered by a 400 hp four cycle diesel. As towboat and tender to the *SM-1*, the *Frances Ann* also hauls fresh water, diesel fuel, drilling mud, cement, heavy cargo and tubular goods. Likewise tending the *SM-1* and its 30-man crew is the diesel-propelled crew boat *Streamliner*, its sleek 48-foot hull plying between barge and shore, its power plant comprised of two two cycle diesel engines. The *Streamliner* has a cruising speed of about 10 mph.

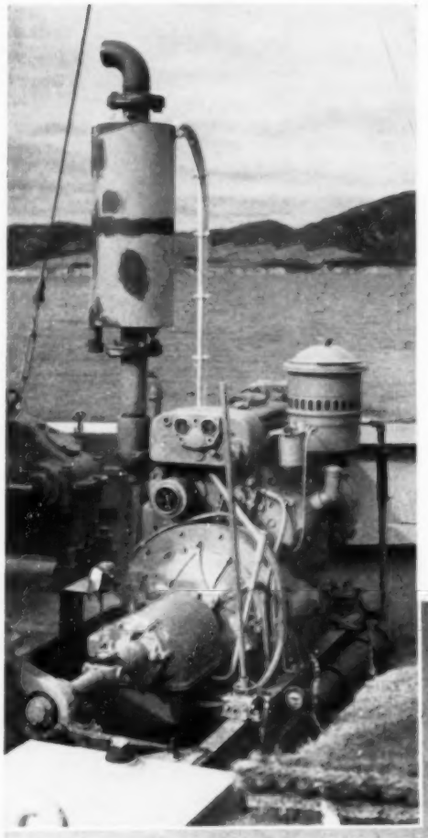
Humble confidently predicts that the *SM-1* will "pave the way for new oil discoveries in the California tidelands." The barge, however, isn't the first exploration rig Humble has had at work off California. Rather, it's a refinement of explorations which Humble began as early as 1948. Included were not only geophysical probings, but a platoon of geologic frogmen who, working from small boats, sampled outcrops along the ocean floor. Need for a more comprehensive study—and actual core samplings—led to design of the offshore exploration barge.

Involved, as you might imagine, are some engineering niceties. Its three mud pump control stations, for example, are air actuated—supplied by two compressors powered by 15 hp electric motors (and installed in the engine room). Additionally, two smaller air compressors, mounted integrally with the drawworks, operate air controls, clutches and brakes. Air-actuated, too, is a reel—which pays out hose through which drilling fluid returns are obtained.

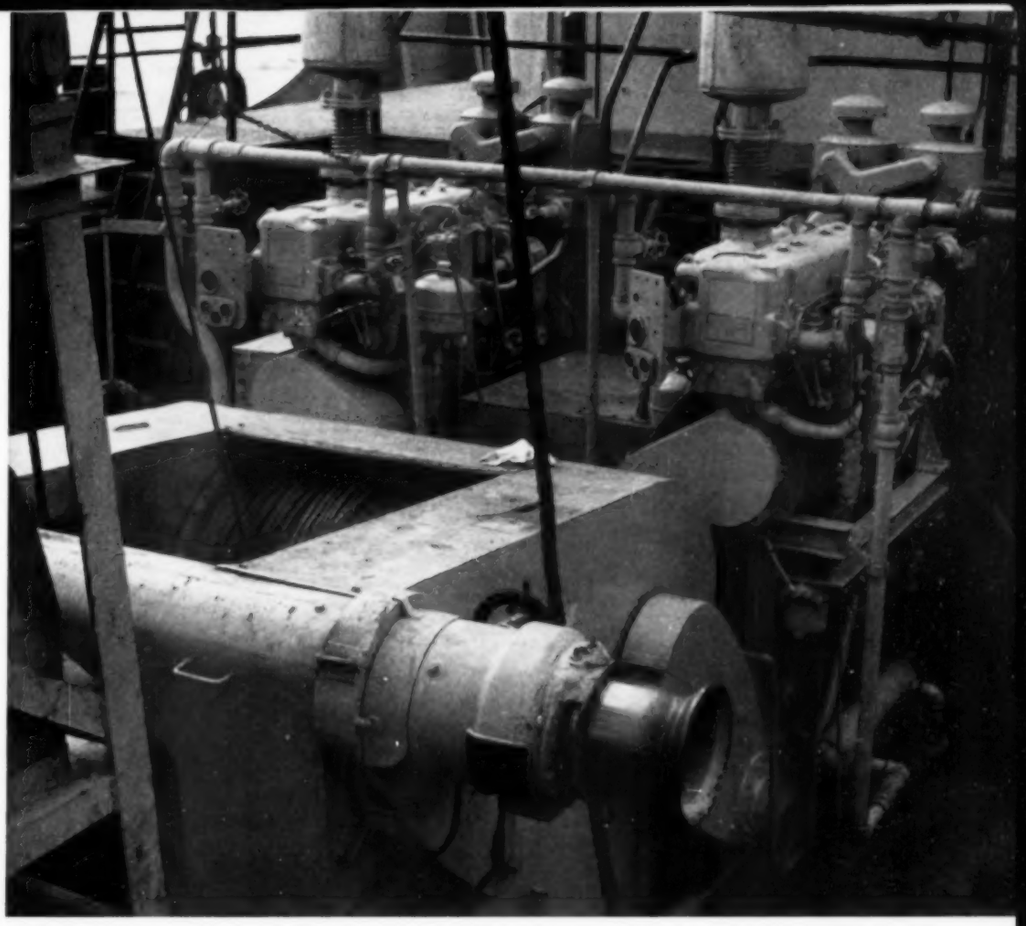
Humble SM-1 drawworks and rotary-table are uniquely and compactly engineered—the drive mechanism held to a length of 14½-ft so as to both fit the landing craft's hull and allow working deck area. Drawworks and rotary-table are diesel driven and their torque converters mounted on a framework some 4-ft above deck level. Chain drives connect the torque converter output shafts to close-coupled drive-lines located under the engines. The starboard engine and converter is right-angle connected to a transmission powering the port side of the draw-works drum. The port engine, similarly transmissioned, operates the draw-works drum's starboard side. This second right-angle drive alternately drives straight through to a third transmission—operating the rotary table. While drilling, the port engine is connected to the rotary table, and the starboard engine operates the drawworks drum. When pulling pipe, both of the engines may be connected to the drawworks drum for optimum power.

Most interesting, perhaps, was solution to one of the thorniest problems endemic to shipboard drilling: maintaining a relatively constant weight on the drill bit when the ship is acrest—or in the trough—of a wave. The modification automates wave compensation—maintains constant bit weight. The complexities of the set-up are many for, not

Close up showing bow anchor windlass engine, hydramatic drive and shift lever.



only must the hoisting diesel and its torque converter keep feeding out drill line as the bit goes deeper, but at the same time it must compensate—and instantly—for wave action, allowing the drill line to pay-out as the ship crests a wave, to reel-in as the derrick (and barge) wallow a trough. The problem in brief: the usual drawworks torque converter has a stall ratio of 2.8 to 1. Torque output of this engine-converter combine is predictable when the driving and driven elements of the converter rotate in the same direction. This condition is referred to by the engineers as *positive speed range*. However, torque output is unpredictable when rotation of the driving and driven elements are in the opposite direction—a condition labelled *negative speed range*. Thus, it was necessary to modify the standard torque converter of the rig's #2 hoisting engine . . . modifying it to approach hydraulic coupling conditions in the negative speed range, this to assure uniform feed-off of the drilling line, yet retain sufficient torque multiplication



Draw-works and rotary table drive on *SM-1*. In drilling operations one engine drives rotary table, another drives draw-works. For pulling pipe both engines are cut in to opposite sides of the draw-works drum for maximum power.

Floating drill barge now at work in waters off Santa Barbara, Calif., is Humble's latest tool for exploring the West Coast tidelands. Wells drilled from its rolling deck will help company geologists evaluate areas for possible leasing and wildcat drilling.

to provide hoisting. Modification saw redesign of one of the convertor's stator blades, reducing the stall torque ratio to 1.8:1. This lowered the change in torque per unit change in speed, particularly in the lower and negative speed range. Further, to absorb the horsepower developed when the engine is statically supporting the drill string load, an auxiliary, thermostatically controlled heat exchanger was installed on the hydraulic system of the converter. The exchanger dissipates converter heat when the engine isn't spooling in or paying out the pipe string. The exchanger, then, takes up the engine's load—converts it to heat. Otherwise, the converter might be burnt up, for the system requires not only a constantly running engine, but relatively high throttle. And deeper the drill string goes, the higher the throttle setting to balance the ever-increasing weight of the pipe string. Here's how the system works in practice: suppose the driller desires a load of 4000-lbs on the hole bottom and the drill pipe weighs 20,000-lbs. Thus, a total 16,000-lbs must be suspended by the drawworks. The driller sets the engine throttle at a speed such that this 16,000-lbs will be suspended by the engine and converter in much the same manner as holding a car on a hill with the accelerator. When the rig rises on a swell, the bit is momentarily lifted from the hole bottom. This increases the weight on the drawworks from 16,000-lbs to 20,000-lbs. Because the throttle is set to hold only 16,000-lbs, the engine and converter will not hold the additional weight. Thus, the converter slips backwards (is in "negative" speed range), unwinding the cable and lowering the drill bit back to the hole's bottom—and, in the process, restores the 4000-16,000-lb balance. Conversely, when the rig lowers into the trough, the pipe is momentarily forced down on the hole's bottom. This removes load from the drawworks and again, because of the throttle setting, the converter goes into multiplication. The drawworks takes up cable until the load's again balanced at 16,000-lbs—restoring the 4000-lb load on the hole.

Sums up a Humble engineering report: "The modified stator causes a torque converter stall characteristic which is such that the drilling line automatically feeds off when drilling weight decreases and reels in drilling line when drilling weight increases. This feature is especially desirable in rough weather when the barge has a large amount of vertical movement." The *Humble SM-1* is installed with well logging gear (mounted atop the superstructure), radar and other navigational gear, including a fathometer. Says Humble, "finding oil in these submerged lands—if there is any oil there—certainly will not be easy. At best, it will be a long, complicated and costly process. But Humble's *SM-1* and the core holes drilled from its rolling deck promise to aid the search."

Editor's Note: Humble Oil people, in returning this article as "O.K. to run," deleted names of all equipment manufacturers. We felt constrained to do what they ordered, but we feel our readers are entitled to a little fun, so here is a tough contest: The nine two-cycle diesels and their torque converters were made by two separate divisions of the same Corporation. Name the make of engines and the torque converters!

COOLED GAS TURBINES

By W. O. FLASCHAR,* and SUMNER ALPERT**

AS gas turbines find more applications in military and commercial activities, there is an ever-widening interest in methods of increasing the efficiency of these simple, dependable prime movers. The use of cooled turbine blades, allowing higher gas temperatures and consequent higher efficiencies, is one method now being studied. With cooled turbine blades, longer life machines can be built which would allow the gas turbine to be more competitive in cost for many industrial applications. Considering the effect of turbine inlet gas temperatures on overall efficiency for a pressure ratio of 6 to 1 and currently attainable component efficiencies, the values shown below are obtained:

Max. Temp. Deg. F	Specific Fuel Consumption Lbs/Hp-Hr
1500	.593
2000	.541
2500	.534

As can be seen from the above tabulation, much can be gained by increasing turbine inlet gas temperatures.

However, for optimum efficiency, the cycle pressure ratio should increase with increasing gas temperature. Tabulated below are optimum pressure ratios and thermal efficiencies for a range of turbine inlet gas temperatures.

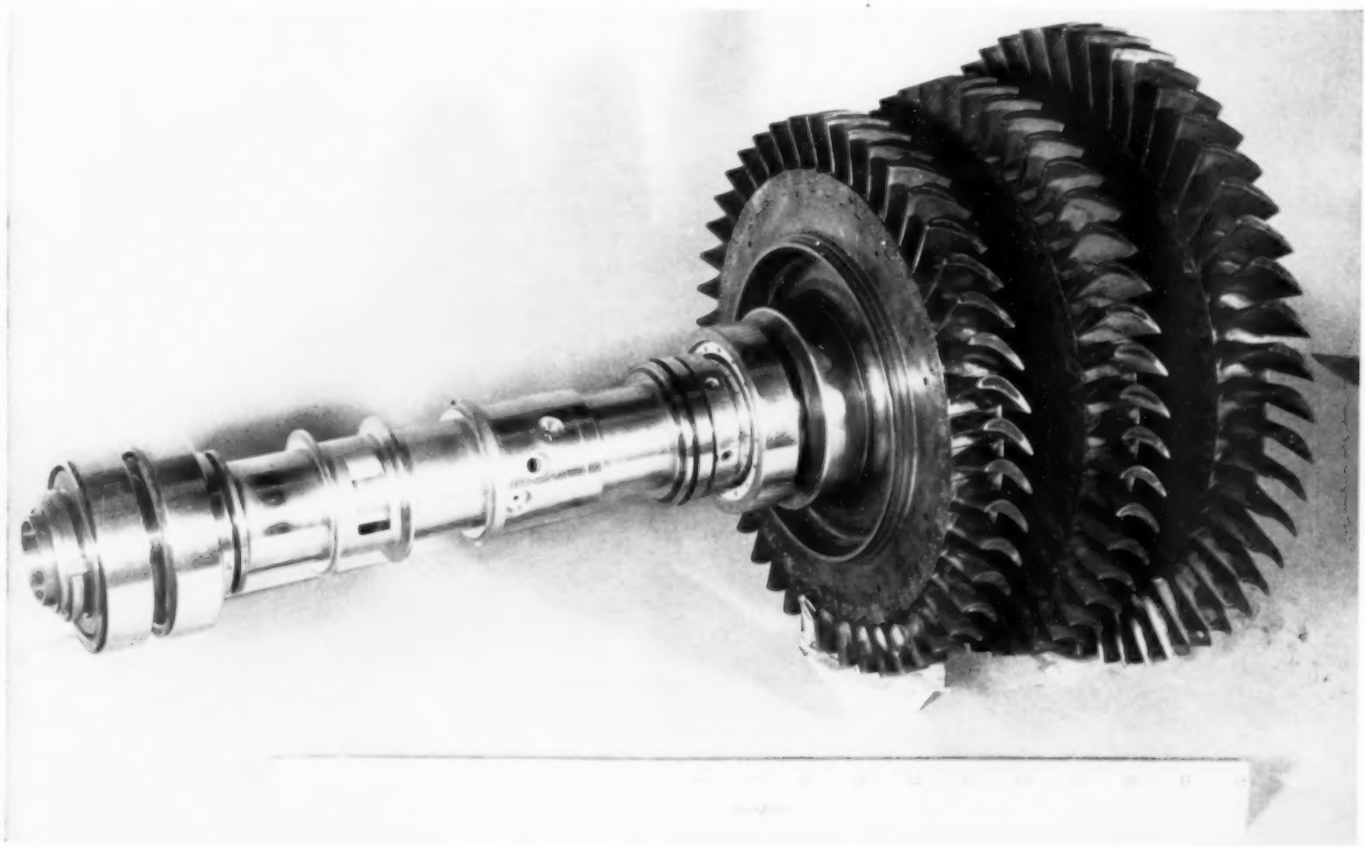
Max. Temp. Deg. F	Optimum Pressure Ratio	Specific Fuel Consumption Lbs/Hp-Hr
1500	16	.524
2000	26	.398
2500	37	.334

These thermal efficiencies have been calculated for an uncooled turbine. With cooling, losses are introduced that will reduce the attainable efficiencies. The magnitude of such losses is dependent on the methods of cooling employed.

The marked effect of blade cooling on turbine life is due to the rapid loss in the strength of materials at temperatures over 900 F. Many of the high temperature alloys, including the so-called super alloys, have poorer strength characteristics below 900 F than the lower alloy, heat-treatable materials. Without cooling, the maximum gas temperature is limited by the desired power plant life, and for industrial applications long life means low turbine inlet temperatures and, thus, low thermal efficiencies. With a cooled gas turbine, maximum temperatures may not limit life, and long life and high efficiency are attainable. The limit on temperature for a cooled turbine will depend both on the materials used and the method of cooling. It appears that low alloys can be used with gas temperatures up to 1750 F and high alloys up to 2500 F. Since the rotor blades of a turbine are the most highly stressed parts, greatest attention has been devoted to them. Many methods of cooling turbine blades have been proposed; some have been investigated experimentally, and a few have been employed in actual engines. Blade cooling methods

**Experimental Engineer Solar Aircraft Company*
***Chief Technical Engineer Solar Aircraft Company*

The photograph of the Solar T-500 turbine rotor assembly shows, from left to right, the double set of ball bearings, the coolant inlet inducer, the coolant discharge slinger with metering orifices installed, the roller bearing, and the overhung three rotor assemblies. The blades are individually attached to the rotor, providing ease and economy for blade replacement in the event of blade damage. The shaft is of two piece brazed construction with flutes machined in the inner shaft to transfer the coolant to and from the rotors. Both blade and rotor coolant circulation are parallel circuits flowing a total of approximately 18 gpm of coolant. Individual stage coolant flows are regulated by the discharge orifices. Pressure of the coolant in the blades, at 20,000 rpm rated speed, is approximately 9000 psi.

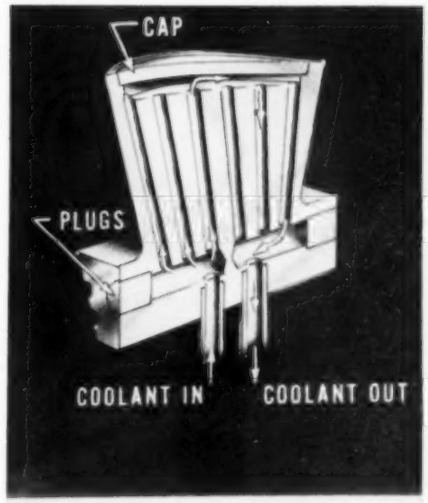


can be grouped into two main categories—air-cooled and liquid-cooled. Generally, the air-cooled blade utilizes an open system in which the cooling air enters the gas stream, while the liquid-cooled blade has been investigated in both open and closed systems.

There have been three basic methods proposed for air-cooled turbine blades, all of which are open systems. These three are: forced convection, where air is passed through blade passages and leaves the blade at the tip; transpiration cooling, where air is forced through a porous blade and keeps the blade cool by forming a film or boundary layer on its surface; and boundary layer cooling, where air is introduced through the blade to an opening along its leading edge. There are several advantages to air cooling that favor its use in aircraft engines. No external system is required since the air may be bled directly from the compressor and passed through the shaft to flow radially through the turbine rotor. There are, of course, some pressure losses involved in passing the air from the compressor to turbine.

In the forced convection method of air cooling, the heat rejected to the cooling air from the blade is not lost, because the air passes into the gas stream. In the boundary layer method, there is no heat rejected from cooling since the boundary layer merely presents a low heat transfer medium. In all cases of air cooling on open systems, the work of compressing the cooling air is not entirely lost, because some of the energy can be recovered in the turbine. An air-cooled blade does not have as low a blade temperature limit as a liquid-cooled blade. The National Advisory Committee for Aeronautics and other agencies have collected considerable data on air cooling of turbine blades, but very little effort has been made to build a workable engine utilizing air-cooled blades. During World War II, the Germans, because of their lack of high temperature materials, designed and built jet engines utilizing forced-air-cooled blades. By passing air through a hollow blade, they were able to achieve turbine inlet gas temperatures up to 1550 F with low temperature blade materials. Both open and closed systems have been investigated with liquid-cooled turbine blades. In open systems, two basic methods have been studied: transpiration cooling and spray cooling. Transpiration cooling consists of forcing the liquid, generally water, through a porous blade. The heat transfer principle is not the same as for an air-cooled transpiration blade, in that the cooling is achieved by conduction of heat from the blade to the liquid and by the heat of vaporization of the fluid at the surface of the blade.

Spray cooling requires the injection of a coolant stream into the turbine so that it impinges on the rotor blades. Because of the high thermal stresses that result, and the high coolant consumption, its use appears limited to short durations for power augmentation. More attractive for liquid-cooled turbines are closed systems in which heat is transferred from the blades to the fluid by convection. The actual mechanism of transfer can be free—or forced-convection; there is uncertainty as to which mechanism will prevail. This is due to the extremely high centrifugal forces caused by rotation which will affect the thermal boundary layer within the cooling passages. Some closed systems allow the heated liquid to flash into steam within the rotor, the steam then being extracted for process use or condensed and returned to the system. With a vaporizing system, higher coolant, and hence higher metal temperatures, can be obtained than are possible with a non-vaporizing system. With a liquid-cooled system in which the fluid is maintained wholly in the liquid state, the lower liquid temperatures results in a higher heat rejection. More complicated liquid cooling schemes have been proposed using sodium sealed within the blades, rejecting heat to a secondary fluid in the turbine disc. A turbine using this method is under development in England. During World War II, a vaporizing type unit was built in Germany and was tested after the War in England. Difficulty was encountered with balance, corrosion, and plugging of cooling passages, and project was abandoned. A small gas turbine with three liquid-cooled turbine stages has been built and is being operated at Solar Aircraft Company under the sponsorship of the Bureau of Ships, U. S. Navy.*** This engine employs low alloy blade materials and operates at a turbine inlet gas temperature of 1750 F. With liquid cooling, lower blade temperatures can be held than with air cooling, and pumping power requirements are lower. These advantages are offset by the need to supply the coolant from external tanks and to provide coolers and a heat sink; however, for stationary and marine power plants, these complications may not be serious. Other problems must be solved to permit full utilization of cooled gas turbines. As the turbine inlet gas temperature increases, components other than the blades must be cooled. To provide cooling passages within blades and other parts, simple solid construction must be abandoned for fabricated construction. Drilled passages and brazed sheet metal structures can be used, but their fabrications costs are high. For low alloy parts, corrosion must be retarded, and ceramic, nickle, or diffused chromium coatings have proved effective. Though progress has been made, additional development work is required to produce practical and economically feasible cooled gas turbines. The general principles are known, but they must be reduced to practice for specific applications. The higher efficiency and longer life obtainable provide definite incentives for such development. With the high temperature turbine, the addition of regeneration can produce extremely high thermal efficiencies.

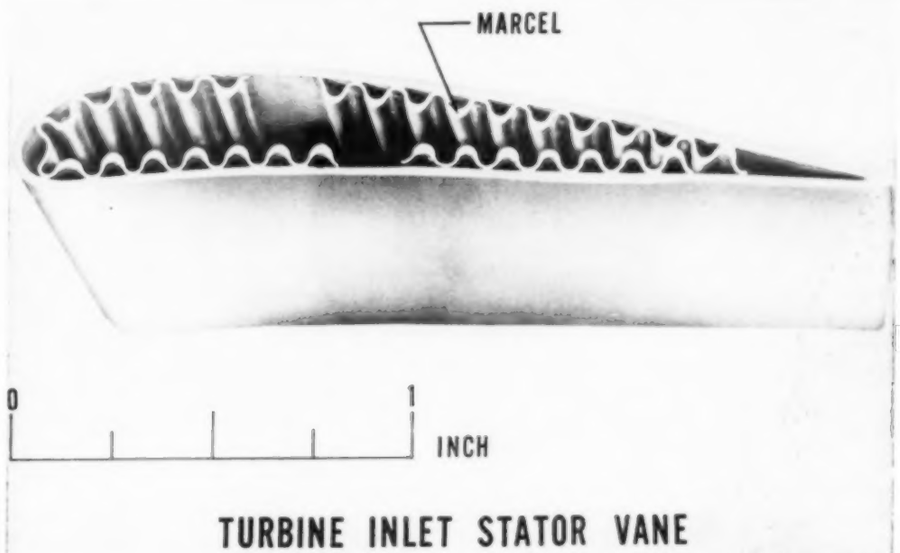


CUT-AWAY OF ROTOR BLADE

This cross-sectional view shows the general arrangement of a liquid-cooled turbine rotor blade developed at Solar. After the six coolant passages are drilled, the tip cap and two side plugs are brazed in place. Distilled water with a sodium chromate corrosion inhibitor is used as a coolant, with a flow rate of approximately .12 gpm per blade.

*** *"Application of Internal Liquid Cooling to Gas Turbine Rotors" by S. Alpert, R. E. Grey and D. D. Drake, ASME paper 55-A-202.*

The sketch shows a cross-section of the fabricated, air-cooled Solar T-500 first stage stator vane made of NAX material. Marcel is brazed to the inner surfaces and a plug, not shown, is fitted into the center section to direct the cooling air flow along the surfaces of the marcel and vane, producing higher heat transfer rates. Vanes are brazed into an inner and outer ring and assembled into a housing with suitable air ports.



TURBINE INLET STATOR VANE

diesel tractor that would conform, as nearly as

FORD UNVEILS NEW DIESEL TRACTORS

By J. W. BROWN*

THE Ford Motor Company Tractor and Implement Division made public on March 12th the details of a new line of diesel tractors for farm and industrial use. Powered by the first U.S.-made Ford diesel engine, these new tractors arouse a great deal of interest for at least three reasons: first, as the first American-made Ford diesel product; second, because of their similarity in size, weight, and overall appearance to existing 1958 Ford gasoline tractors and last but far from least, because of a significant achievement they made in cutting the price differential between gasoline-engined and diesel-engined tractors.

In our capacity as a DIESEL PROGRESS representative, we were privileged to a personal, advance showing of these new tractors and were immediately impressed by two things: the clean, uncluttered look of the engine when tucked away under the fuel tank of the Ford's 3-4 plow 801 and 901 series of tractors and the fact that you literally have to look twice to detect any outward difference of appearance between these and the gasoline-engine powered models. We were equally impressed later, when we were shown the comparatively short time it will take a farm tractor owner (let alone an industrial user) to amortize the difference in cost between his diesel tractor and the equivalent tractor powered by gasoline. The actual difference in suggested list price will be only $395.00. If the agricultural owner uses his tractor only as much as the average, and estimating only 3 cents per gallon price advantage for diesel fuel over farm-use gasoline, this differential would be amortized in approximately two and one half to four years, depending upon power needs. When amortized over a five year period, the tractor would need to be used only 330 to 550 hours a year at this same very conservative fuel price differential. Ford engineers predict as much as a 40 to 50 per cent fuel cost savings for the diesel over the gasoline tractor doing equivalent work.

The $395.00 price differential compares most favorably with gasoline-to-diesel differentials of other tractors which up to now have run from $550.00 to $850.00. It would appear to be a really significant breakthrough of the cost barrier, as Ford Tractor officials believe it to be. In a statement to the press, Merritt D. Hill, General Manager of the Ford Tractor and Implement Division said: "The cost breakthrough came by redesigning some components of the high-volume gasoline 4-cylinder tractor engine so that many of its parts could be used for a diesel engine. These economies of volume production and interchange ability are being passed on to the farmer and industrial user."

Several things made it possible for Ford to use the gasoline tractor engine as a basis for the diesel. In the first place, they had a rugged, simple engine design to work on. The engine already had dry type replaceable cylinder liners—a fact that goes a long way toward warranting a heavier original investment than "en bloc" cylinders. Another was the time factor in that they obviously refused to rush into the job. Over a three year period gradual changes have been made in the gasoline engine components both to strengthen and accommodate them to other strictly diesel components. A third, and very important factor to our notion, was the availability of the simple, effective, rotary Roosa Master fuel injection pump which Ford engineers were able to slip right into the place of the spark-ignition distributor. Mounted vertically as it is on the side of this compact four-cylinder engine block, the fuel system requires only short fuel lines leading to the Simms needle-valve injection nozzles, and the resulting appearance is very neat and clean.

To change the 1958 Ford *Red Tiger* gasoline engine into a diesel engine required redesigning the OHV head; providing new pistons; providing a new crankshaft and flywheel; changing from a 6-volt to a 12-volt electrical cranking system and substituting the Roosa Master pump and Simms injectors for the distributor, coil and spark plugs. Also new are the piston pins, connecting rods, rocker cover, intake and exhaust manifolds and air cleaner. Because of the larger (diesel) air-intake requirements, the engine head was completely redesigned to allow freer breathing. At the same time, the diesel cylinder pressures and required 16-to-1 compression were taken into consideration, and the mounting of the Simms 4-orifice nozzles. Despite the changes, the new engine head still has many machining operations in common with the gasoline engine head.

Heavier (aluminum) 5-ring pistons were provided for the diesel engine and the piston pins were increased in size from 0.91 in. OD by 3.17 in. in length to 1.25 in. nominal OD by 3.23. The over square bore and stroke—3.90 in. by 3.60 in.—remain the same in the diesel as in the *Red Tiger* gasoline engine. A new counterbalanced, forged steel crankshaft is provided for the diesel. The connecting rod journals remain a nominal 2.30 in. diameter and the 2.50 crankshaft main journals are the same as in the gasoline version. Their surface lengths also remain the same. The connecting rods are of forged alloy steel. Bearings are shell type replaceable, steel-backed copper-lead.

With the engineering department so busy getting their new baby on the market, we were unable to get a cutaway view of the new engine, but it is very uncomplicated and easy to visualize. A gear-operated camshaft runs in about the same horizontal plane as the crankshaft, on the right hand side of the engine looking forward. The driven gear on the front end of the camshaft meshes directly with a drive gear on the front end of the crankshaft, both running in an oil-flooded gear case. Between the first and second cylinder locations, the camshaft is fitted with a pinion which meshes with a worm gear to drive a nearly vertical shaft which in turn engages the Roosa Master fuel injection pump shaft. Push rods operated by the cams extend upward through cavities provided in the block to where they engage the valve rocker arms in the head. All parts are pressure lubricated by means of a gear type lube oil pump located in the crank case at the lower end of the shaft which drives the injection pump.

To secure low cyclic speed variations, the Ford Tractor diesel has been given a larger flywheel than was in Ford's gasoline engines. The clutch housing was redesigned to accommodate the larger flywheel. "Firing order" or injection sequence of the engine is 1-2-4-3. An inspection plate makes timing marks (in degrees before and after top dead center) visible on the flywheel. These timing marks are synchronized with a timing mark on the fuel injection pump to insure proper injection timing. Air for the Ford diesel tractors enters through louvres in the hood of the tractor, passes through a pre-cleaner and then through a tray-type oil-bath cleaner manufactured for Ford by Industrial Wire Cloth Products, Inc. From the new Owner's Manual prepared by Ford Tractor and Implement Division, this air cleaner appears to be easy to service.

To assist in cold-weather starting, two optional battery-energized glow plugs are available for use in the air-intake manifold. Tests indicate that these should take care of starting any Ford diesel in good mechanical condition down to about 15° Fahrenheit. Below 15° ether may be sprayed into the air intake louvres or the tractor can be supplied with an ether capsule starting apparatus. The new Ford diesel tractor will be available in four of the 801 series utility and all-purpose models and in three of the 901 series row-crop models. They will provide 40 belt hp at 2200 rpm with 5-speed transmissions; 37 belt hp at 2000 rpm with the 4-speed transmission. Manufacturer's rating of drawbar horsepower is 35 at 2000 rpm. Fuel tank capacity is the same as in the gasoline tractor (17 gallons). All other external characteristics are very similar and the same agricultural and industrial accessories will apply to both. Weight increase of the new Ford diesel tractor over its equivalent gasoline model is only about 100 lbs. The diesel, like the large Ford gasoline tractors, will handle 4-bottom plows in most soil conditions, and perform equivalent industrial work.

Development of the new Ford diesel tractor was under the supervision of Ray J. Miller, division chief engineer, C. T. O'Harrow, chief tractor engineer and Bert Burnside, supervisor of engine design. Asked for a statement as to the bench marks set up by the Ford diesel tractor designers to guide them in their work, Mr. Miller said: "We had three main objectives: First, we wanted a

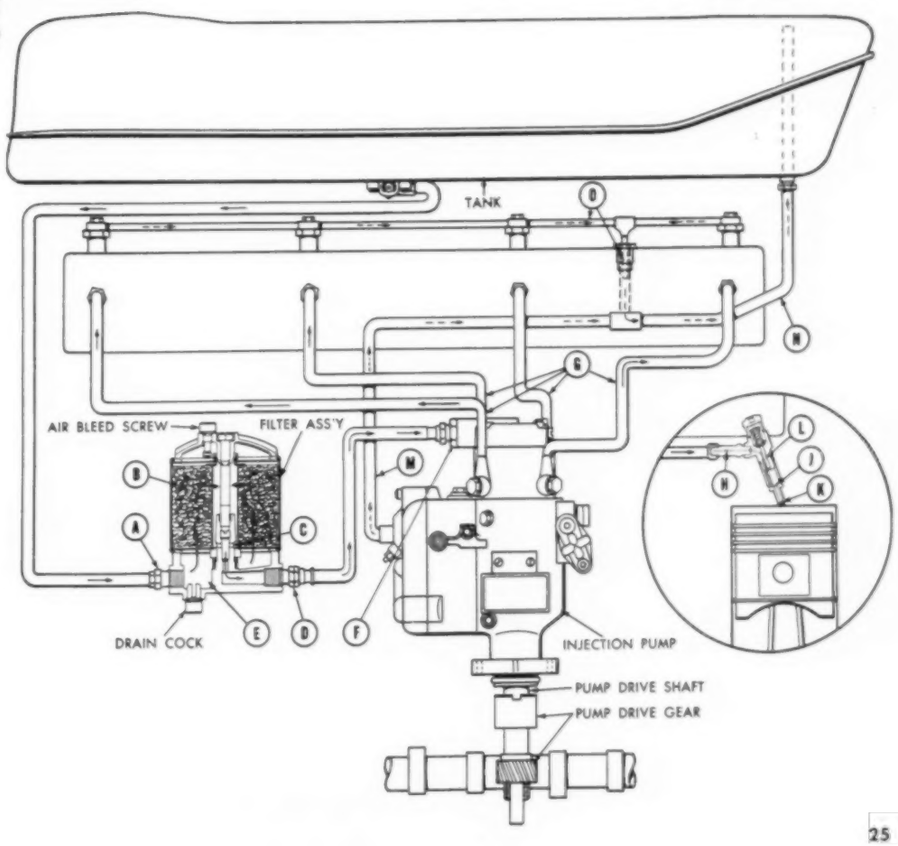
*Midwest Editor DIESEL PROGRESS

diesel tractor that would conform, as nearly as possible, to the lines, over-all dimensions and performance of our 801 and 901 gasoline tractors. Next we wanted to achieve, through manufacturing economies as favorable price characteristics as possible, and finally, we wanted to produce this engine on the same high-precision, automated machining and assembly lines as the gasoline engines." From where we sit, it looks very much as if the Ford Tractor and Implement Division engineers are to be congratulated on having achieved their objectives.

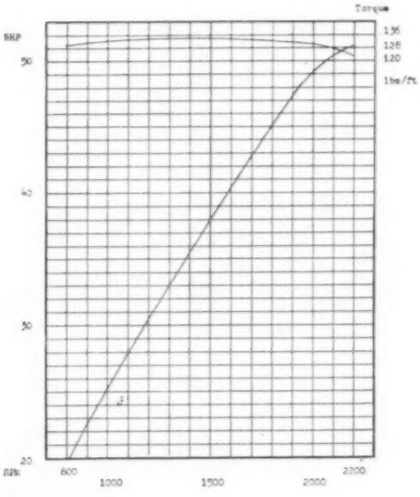
This is the new all purpose or utility type Ford diesel tractor now available for many industrial applications.

Features of the Ford diesel tractor, except for its power plant, are identical with new Ford gasoline and LP-gas models, and all Ford implements will fit the new diesel tractors without modification.

Fuel injection system of the new Ford diesel engine is shown schematically. Fuel enters the fuel filter at (A), passing through the filter element at (B), and emerging through (C) to the outlet (D). Sediment is trapped at (E). The Roosa Master injector pump draws fuel in at (F), and meters it in sequence to the four Simms fuel injectors through the pressure tubing indicated by (G). Circular inset shows a fuel injector at the compression stroke with the piston at the top of its travel. Fuel enters connector (H) and travels to points (J) and (K) on plunger (L). A fluid pressure build-up occurs until the tension of the injector's spring can be overcome, at which time the fuel is injected through four holes into the combustion chamber. With a compression ratio of 16 to 1, compressed heated air in the cylinder ignites the fuel. Excess diesel fuel is circulated through the injector pump and injectors to lubricate these assemblies and returns to fuel tank through tubes marked (M), (N), and (O).



Engine performance curves—4 cyl, 3.90 bore; stroke 3.60; 172 cu in. displacement, 16 to 1 compression ratio.



AGRICULTURAL DIESELS

By F. HAL HIGGINS

OPERATING Costs for Farm Tractors and Trucks in New York" is the title of a recent bulletin from Cornell University's Dept. of Agriculture. It is authored by Stevens and Stanton. Costs in New York over a recent 5-year period were used in this study. Also costs per hour for 1-, 2- and 3-plow tractors in light, medium and heavy soils. While no study was made or figures given to show cost-cutting by diesel tractors, the comparison of 1- and 3-plow tractors in this eastern area indicates the bigger tractor produces three times the output for only an extra 35 cents an hour. Also owners of the bigger tractors used them more hours per year to increase the tractor's work hours and reduce the cost per hour. Prof. Orville French, head of the Ag. Engineering Dept. at Cornell, writes he will be leaving for the Philippines early next year to wind up a program of rebuilding that new nation's agricultural college that was completely wiped out in World War II.

Big diesel motor trucks will replace the famous "splash-dam" system of getting the logs to the mill for the Menasha Plywood Corporation at North Bend, Oregon. Four Allis-Chalmers HD21s have been busy at widening old roads and building new ones for a fleet of 20 diesel trucks that will replace the old system. The new turbo-charged HD21s are aimed at the demands of the modern logging, say Allis-Chalmers engineers. This firm pioneered the torque converter drive and has improved its application over the years.

A diesel pile hammer is announced by the Link-Belt Company. Three models are being built at the start: 105 delivers up to 7,500 ft lbs per blow, 312 delivers up to 18,000 ft lbs, and 520 up to 30,000. Any power crane, says Link-Belt, can be easily transformed into a pile driver. The company's Cedar Rapids plant has been recently expanded and this line is manufactured there.

Three big Cummins-powered Peterbilt Motor trucks are now on the job for Lindsay Ripe Olive Company, Lindsay, Calif. Manager Harold Schutt pointed to two of them at the plant early one morning when DIESEL PROGRESS' Western Field Editor called there. They were proving a fine investment in transporting the product of this co-op farmer plant to such marketing centers as Los Angeles, San Francisco and Salt Lake City. The Association handles the crop for some 122 members and employs 750 people. Many of the growers own diesel tractors—International, Allis-Chalmers, Case, Caterpillar, Ford, Minneapolis-Moline, Wagner—and diesel engines for irrigation pumping in some cases.

Another 1,000 mechanical refrigeration cars are to be built by the Pacific Fruit Express starting in Dec., 1957, and continuing through 1958. Half of these will be the large 50-ton capacity cars designed for transporting frozen food from the West to the consuming centers of the U. S. and Canada. These are in addition to the 714 of the same type built in the last few years and proven the answer to moving the quality California fruits and vegetables from producing to consuming areas as a mighty factor in holding up and increasing the West's agricultural income while holding down costs to consumers for increasing diets of fresh fruits and vegetables. The other 500 cars being built under this expansion program by the PFE are 40-ton size designed for both frozen and fresh fruits and vegetables. All are to be powered by diesel engines. The large cars will have the GM 271 and the smaller units the Witte 100 engines. The new brushless type alternator developed by Delco will be used in these cars. However, other manufacturers might be in this trend also, suggested a top PFE official in an interview with DIESEL PROGRESS' reporter.

Allis-Chalmers has announced a new tractor with choice of gas or diesel engine. The D17 has the "new exclusive Power Director" which permits quick on-the-go shifting. It is aimed at the trend to bigger farms and will handle 5-bottom plow, 15-foot tandem disk harrow, etc.

Cornell University's Agricultural Engineering Department comes up with a new farm tractor idea in its pivot unit to permit one operator to use two wheel tractors. The pivot unit bolts under the rear tractor and operator power steers with hydraulic cylinders at the pivot to swing front tractor around corners, says Jim Gorman, the Cornell Ag. engineer who developed the idea. There are no front wheels on either tractor, giving the telescoped pair four big wheels on the ground. The hookup can be made in 1½ hours. This could develop into a trend in the eastern and southern states where tractors and farming is on a smaller scale. Western farmers, however, are likely to go for one bigger diesel tractor in both wheel and crawler models.

Farm wage indexes hit an all-time high at 365 on Oct. 1, 1957, using the USDA's 1910-14 level. Number of persons at work on farm the last week of Oct., 1957, was about 300,000 less than a year earlier. The economic shift of population from farm to industry, retail business and services continues with emphasis on better farm management of skilled labor on more and bigger machines.

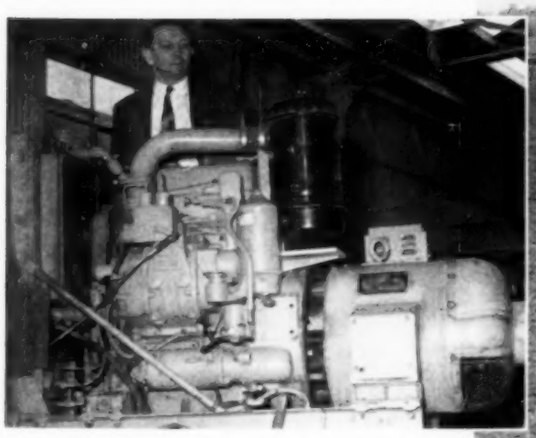
A 2,000-mile coverage of California farm harvests and road construction late in November by your reporter showed rice harvest completed by those operators with the big diesel one-man bulk combines while those still using the old gasoline powered combines were bogged down with each rain. Practically all the big $35,000 to $40,000 diesel combines built over the past 15 years are powered by GM engines in pairs.

California cotton harvest was in its late stages when viewed from auto and check-up at tractor dealers in mid-November. It was noticed that International diesel tractors were carrying that company's pickers in most fields from Bakersfield north to Fresno. Some hand picking was seen in small fields and in a final last picking after early harvests had gathered most of the crop.

Chico, Almond center of the world, grows 20% of the world's crop and is Butte County's no. 1 crop. Rice held that honor for many years until the cut-back in acreage for Government controls. Both are highly mechanized with diesel tractors, trucks and combines. Practically all ground work for the rice crops is diesel. Its marketing from drier bins to mills and back to wholesalers is a diesel trucking job. A stop at the new mill of

Getting rid of stalks of cotton and corn crops is one of the farm problems. First, the stalks are dry and tough; hard to chop up. The mulching value of the chopped stalks is needed for nitrogen and loosening of tight soils. In the corn belt, control of the boll weevil is a problem.

Hashing of stalks to bring out the hiding boll weevil eggs for winter killing is a factor. Powering his home-designed stalk hasher to prepare seedbed and chop the stalks into the soil at one pass, a GM diesel engine was installed to solve the problem.



The Railroads are doing a whale of a job in increasing fresh fruit and vegetable markets for California and Arizona with mechanical refrigerator cars. Here is a GM diesel engine at Pacific Fruit Express shops at Roseville, California, being made ready to go into one of the new long cars built to handle frozen foods across the nation from processing plant to consuming center.

John Deere 820 diesel tractor powering two hydraulically controlled John Deere LZA Stubble-mulch drills with both fertilizer and grass seed attachments.

This International corn picker was caught in one field on the Herringer 500 acres of corn. It is hung on an IHC diesel wheel tractor—MD—with an Ottawa sheller trailed to shell corn as husked and dropped into sheller. The outfit was covering as much acreage and doing a clean job, all agreed who saw it.

Farmers Rice Growers in West Sacramento one morning showed a fleet of diesel trucks—Mack, White, International—loading or unloading rice. Cummins engines in many.

The Thornton Research Centre of Shell Research, Ltd., in England has recently carried out a systematic study of the effects of a wide range operating variables on the rates of wear of diesel engine cylinders and piston rings. Oil viscosity and type, engine load and speed, and water temperature are some of the variables studied. Additives cut down wear, this study found. The engine operator still holds the key to the life of the engine, says *Oil Engine and Gas Tubine*. The Lanz Bulldog Models C and H have recently gone through the Marburg test.

The British Perkins diesel is offered owners of old Fordson, Nuffield, Farmall and Massey combine owners for conversion from gas to diesel in Australia. The Perkins model L4TA, with conversion assemblies will save up to 75 % of fuel costs, says the Perkins factory, which has dealers in six of Australia's farming areas.

Lister's "freedom" diesels in five models rating from 9 to 54 hp are being installed in Australian sheep shearing stations where they cut costs in powering sheep shears.

Tractor production in the U. S. for farms has been above 1956 each month since April, according to the *Farm Implement News* "Industry Trend." Of the 16,863 farm tractors produced in August, 4,998 were diesel. In the tracklaying types, there were four times as many diesel as gas produced.

One of Jim Ashton's new Oliver Super 66 diesels from a fleet of nine 66s and 77s owned and operated by John Pryor Co., specialists in applying liquid fertilizers in combinations of nitrogen, phosphrous and other elements as needed by each crop and each field treated. Ashton spied this outfit in a field as it was starting to apply a new combination liquid fertilizer and we went over. Note the operator's outfit of tank truck with trailer for his tractor to move from field to field over the territory where the custom operator has orders to stop and give a crop treatment.

PUSH-TUG "SOUTHERN III"

By DOUGLAS SHEARING

THE Southern Towing Company of Orange, Texas, has added a new boat, the *Southern III*, to its fleet which now consists of three tugs and ten oil barges running between Brownsville, Texas, and Florida and up the Mississippi on contract movement of petroleum and petroleum products. The company, headed by Mr. S. C. Trimble, President and General Manager, is new, having been established in June 1956, but it is expanding under able management experienced in this class of work. The new boat, *Southern III*, is of interesting design in that it can operate as a conventional twin screw pushboat or tow astern when called upon to work in waters too rough for pushing. She therefore has a pair of towing knees on the bow and bitts on the stern where ample room is provided for hawser handling.

The *Southern III* is 86 ft long, 28 ft beam, and 6 ft 3 in. draft and is powered by a pair of Fairbanks-Morse 4-cylinder model 38 D8 1/8 opposed-piston diesels, each rated 640 hp at 720 rpm. The engines are equipped with Falk Airflex reverse and reduction gears with 2.1:1 ratio driving 4-blade manganese bronze wheels of 6 ft diameter and 40 in. pitch made by Columbian Bronze Corp. The propulsion power is pilothouse-controlled by a Westinghouse system.

Specifications of the *Southern III* were prepared by the owners and the design was made by Louis Smaihall. Construction was by the Harms-Smaihall Shipyard at Orange, Texas, experienced builders of commercial motor vessels. The finished product is an interesting combination of desirable characteristics. The hull has a total sheer of 18 inches which is enough to improve sea-keeping ability with a tow astern in choppy weather. With bulwarks all the way around and ample space outside the deckhouse, working conditions on deck are very good. There is a slightly raised poop deck aft which provides a convenient place for hawser stowage and increases the headroom for the Sperry steering system and rudder control linkage. This is essential in tunnel stern boats which flatten out aft to keep the propeller clear of the bottom in shallow water. This stern shape is well proven for maximum propeller and towing efficiency in river work. In addition to sheer, the vessel has a spoon bow for easy driving and an inclination to rise and remain dryer than boats of scow bow shape. Since the hull is short, it was necessary to use compact propulsion units to provide the power required and the Fairbanks-Morse opposed-piston engine fits this specification. With a short hull, the side members have adequate strength and a longitudinal center line bulkhead is not needed. This permits an arrangement of machinery simple to install and convenient to work. In fact, there are a number of features of simplicity and space saving worthy of special notice. The engines drive their own pumps which eliminates separately placed motor-driven pumps. On each side of the hull there is a keel cooler which cools the jacket water for the engine on its side, thus eliminating the additional pump and heat exchanger system inside the engineroom. It has the advantage of never clogging and working well regardless of the muddy waters in which the boat floats. It eliminates seachests and interior tanks with baffles to catch silt and sand that will damage pump and clog a heat exchanger system. The net result of employing this method is to reduce the pumping requirements to the essential oil and fuel pumps, an F-M fire pump and two pressure sets, one for sanitary water and one for potable water aboard the boat.

A third simplification is the use of electric heat in the quarters when heat is needed. Two 40 kw 120 volt ac generator sets have been installed with switchboard in a forward compartment separated from the engineroom by watertight doors. No storage batteries are used as the galley range is also electrically operated and one or the other of the generators is in continuous operation. Provi-

The Southern Towing Company's *Southern III* went to work just a year ago handling oil barges on the Mississippi. The vessel is powered by a pair of Fairbanks-Morse opposed-piston diesels.

sion is made for a shore connection in port. Across the after end of the engineroom there is a well equipped workbench and tool board. The only power tool is a drill press. The dual Sperry steering equipment is installed in a stern compartment also separated from the main engineroom by watertight bulkhead and doors.

The upper engineroom has space for a pair of Air-Maze air filters and the exhaust lines leading to Maxim silencers. Adequate lifting gear is provided on overhead tracks for engine overhaul. Otherwise the upper engineroom houses no equipment. Since the *Southern III* has lower and upper deckhouses and a pilothouse above, there is ample room for very comfortable quarters. There are five staterooms in the main deckhouse plus toilet and shower rooms. The upper deckhouse has spacious quarters for the captain forward while the after end is given over to a galley fully equipped with Hotpoint electric range, built-in deep freeze and chill room, stainless steel sink and plenty of dish rack and cupboard space. There is a lunch counter which seats five and a separate table for four. In addition, there is a comfortable upholstered seat at one side. With large plate glass windows and venetian blinds, screened doors on each side and plenty of ventilation, this makes a comfortable spot for the crew to lounge while off watch.

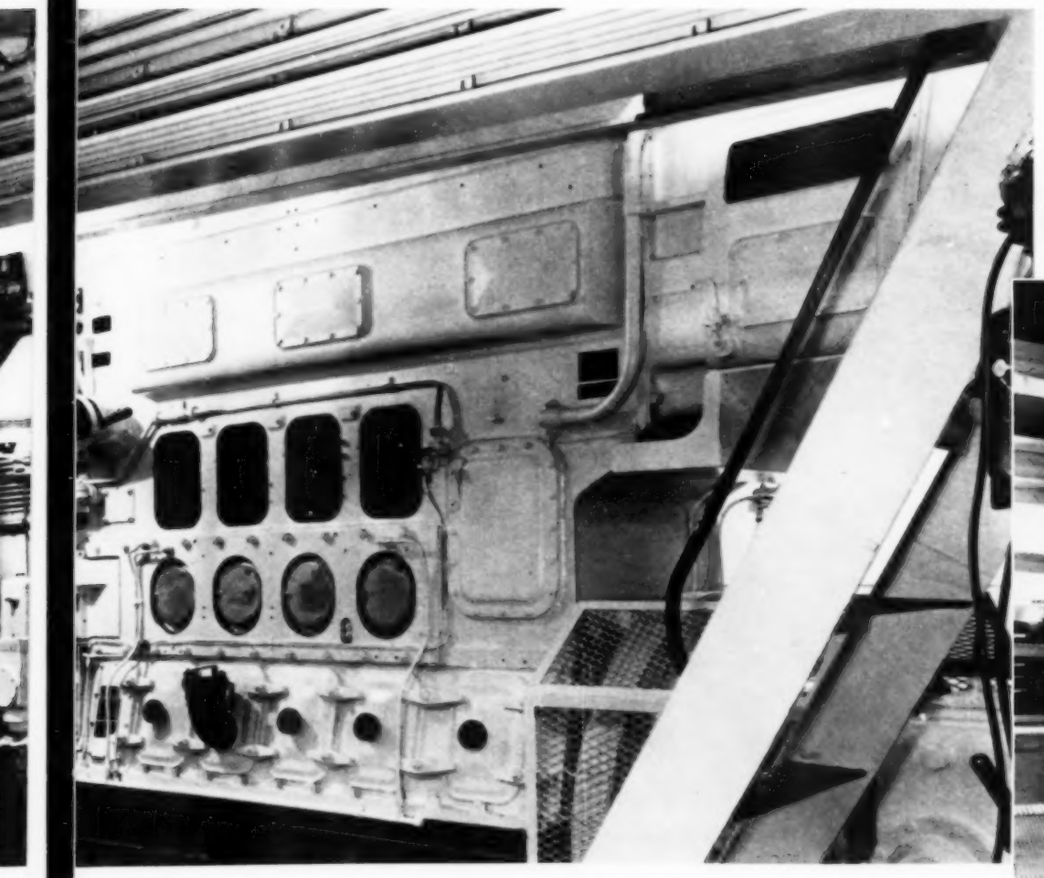
The pilothouse is fully equipped with aids to navigation including Decca radar, 8-in. Kelvin White spherical compass, engine and steering console and finger tip steering of non-follow up type. There is an RCA radio phone, Hose McCann intercom telephone, Kahlenberg horn, 3000 candle power carbon arc Carlisle & Finch searchlight and an incandescent searchlight. The deckhouses are all insulated and sheathed inside with marine veneer. Door trim and screen doors are of varnished wood. The windows are Kearfott with bronze frames. Bunks are of steel pipe in the staterooms and each room is attractively furnished with ample locker space. There is hot and cold running water and electric heat in each room. Ventilation below deck is provided by axial flow fans. The *Southern III* offers solid crew comfort without frills.

Captain Theo Droadus, an affable skipper from Pascagoula, Mississippi, is a young man with plenty of experience on the rivers. He took out the *Southern III* when she entered service in April and has several nice things to say about her. He likes the freedom from vibration and the fine handling qualities. Thus far he has had her in pushing service only. He has been pushing a 40,000 bbl tow from Port Sulphur, La., up the Mississippi to Destrehan and Baton Rouge. The owners are very well satisfied with the performance of the *Southern III* in spite of the fact that the Mississippi has been in flood stage and the current strong.

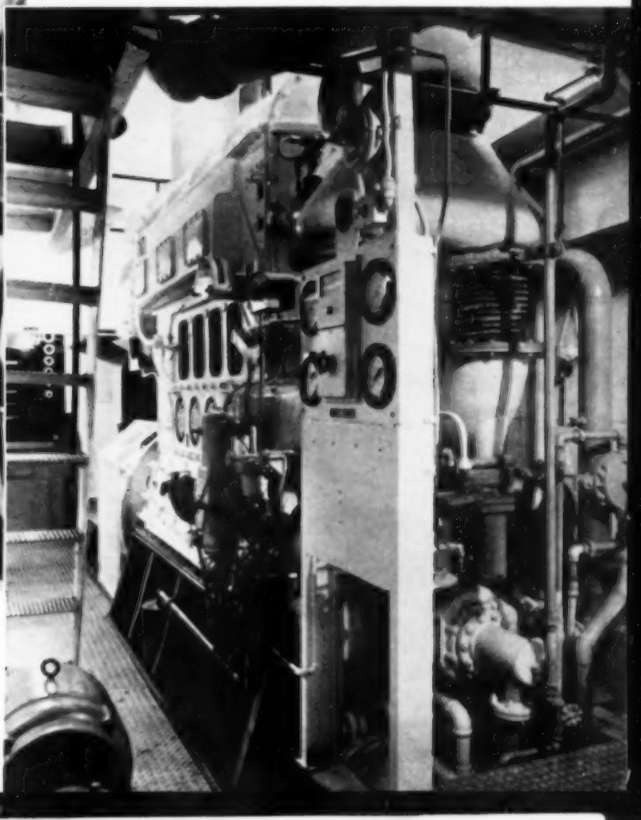
The *Southern III* was skillfully designed to provide ample power for work against strong river currents. The two F-M diesels give a combined 1280 installed horsepower and, with her tunnel stern, make her capable of 1500 hp in thrust. Boat and barges were designed for efficient operation as an integrated tow. As for the engines, Captain Droadus reports that they went to work brand new and have given no trouble at all. There was no "shake down" operation and no period of minor adjustments. While he likes the towing results, the freedom from vibration is what he praises most. This is understandable for a boat that is well designed and constructed and has proper matching of machinery to hull and propeller is not only a top performer but also comfortable to live with. Carrying 600 barrels of fuel, 260 gallons of lube oil and 2500 gallons of potable water, the *Southern III* will operate continuously without replenishing supplies for two weeks at a stretch with a large safety margin. Currently, she does not run continuously as the operation is integrated with her barges and she stands by while loading and discharging barge cargo. She is a marine propulsion attachment for the movement of barges and as such is the ideal combination of ship and power.

Equipment List

2 Main Engines	Fairbanks, Morse & Co. 640 hp, 720 rpm, 38D8⅛ opposed-piston diesels.
Pilothouse engine control	Westinghouse Air Brake
2 Air filters	Air-Maze
2 Exhaust silencers	Maxim
2 Steering gear systems hydraulic	Sperry
1 Whistle air horn	Kahlenberg
1 Strainer duplex	Elliott
Governor	Woodward
Pyrometer	Alnor



Each F-M opposed-piston diesel drives a Columbian Bronze propeller through Falk reverse-reduction gears. This view shows the port engine.



Looking aft at the starboard engine. This view of the Fairbanks-Morse diesel shows the engine-driven jacket water pump, Nugent duplex fuel filter, Woodward governor, and gauge board with gauges and Alnor exhaust pyrometer.

TURBOCOOLING BY COOPER-BESSEMER

Newest Cooper-Bessemer Development For Pulling More Engine Horsepower With Less Fuel

By DOUGLAS SHEARING

TURBOCOOLING, a method for supercooling combustion air, provides an important potential for increasing horsepower output of gas or gas-diesel engines. In some cases these increases are as much as 23%. At the same time, reductions as high as 5.0% in fuel consumption are being realized, according to actual field experience. The inherent advantages of saving on fuel costs and of producing more engine horsepower per square foot of space are of particular importance to buyers and operators of both new and existing engine equipment on pipelines, in gas processing plants or producers of industrial and municipal power, according to Ralph L. Boyer, Cooper-Bessemer's Vice President and Director of Engineering. This is particularly true today when both capital investments and operating costs are being revaluated to maintain profitable operations. At the present time, over 150 turbocooling units are in operation on supercharged gas and gas-diesel, 4-cycle engines, Mr. Boyer points out. Some of these turbocoolers were sent out as original equipment on new engines. Others were installed as complete kits from the factory for customers' existing engines. The first turbocoolers were placed into service as far back as January, 1955, providing fuel economies as low as 6010 btu per brake horsepower hour. Basically, the Cooper-Bessemer turbocooler (Fig. 1) is a turbine-driven centrifugal compressor equipped with an aftercooler. In the past, air from the engine turbocharger has been throttled to the air manifold to maintain correct air-to-fuel ratio. The conventional practice has been to do this with the butterfly valves. Experience has shown this practice a simple waste of energy with little, if any, effect on cooling the intake air. The introduction of the turbocooler, however, has created a practical method of utilizing an abundant source of energy created by a pressure drop in the manifold, which would further cool combustion air going to engine cylinders.

The cooling cycle of the new development is shown in diagram (Fig. 2). In this system, filtered air enters the high pressure turbocharger (1) and is compressed by the exhaust gas driven centrifugal blower (2). The pressurized air at elevated temperature from compression is then directed to a booster (3) in the turbocooler for a second stage of compression. As the air leaves the booster its temperature and pressure are considerably higher than after the first stage of compression. This air is then cooled by an air-to-water intercooler (4) before entering a turbo-expander (5).

Since the pressure of the air entering the turbo-expander (5) is greater than the air intake re-

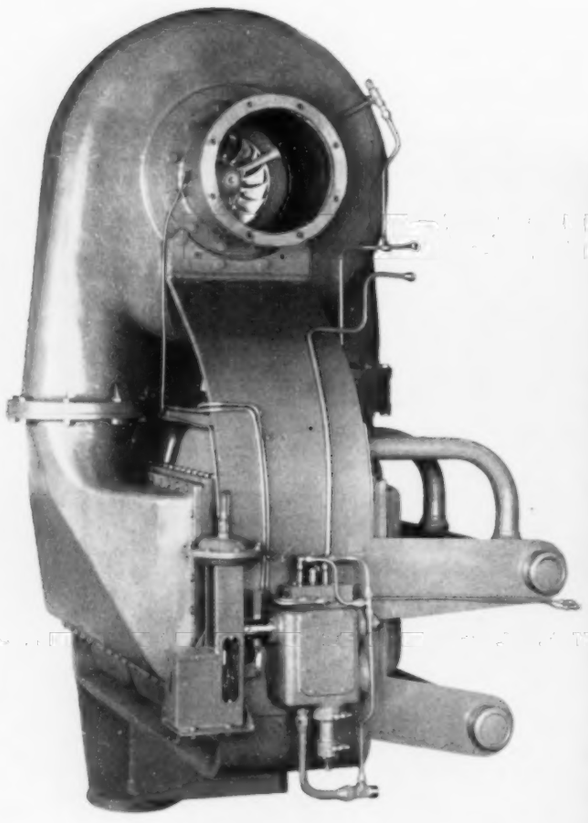


Fig. 1. Exterior view of Cooper-Bessemer AT-18 turbocooler.

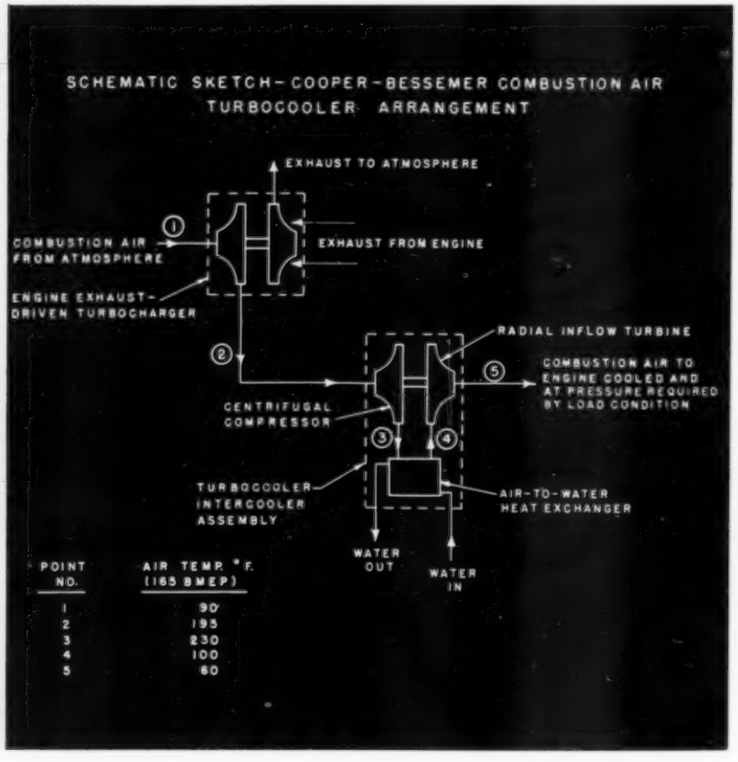


Fig. 2. Cooling cycle of Cooper-Bessemer turbocooler.

quirements of the engine, a pressure drop is available through the expander to motivate the expander impeller causing the impeller to spin. As the same air expands through the impeller, its temperature is reduced by 15 to 40 degrees. The net effect of the turbocooler is to provide the engine with cool combustion air. The more air or oxygen that can be concentrated in the cylinders, the more efficient the combustion of the fuel and the more fuel the engine can take. As a result, engines equipped with turbocooling have the advantage of higher overload capacity with less danger of detonation and less btu consumption per brake horsepower hour.

The cutaway photograph (Fig. 3) charts the progress of the engine intake air through the second or booster stage of compression and through the expander cooler. In reality, the turbocooler is a bootstrap device with the expander impeller and booster impeller on a common shaft which allows the expander to drive the booster. Fuel consumptions of a typical Cooper-Bessemer type LSV-16 supercharged 4-cycle spark-ignited gas engine are charted against load in Fig. 4. Evident is the added economy initiated by turbocooling as compared to conventional aftercooling. An installation of the turbocooling system is shown in the drawing Fig. 5, outlining graphically the engine installation illustrated in Fig. 6.

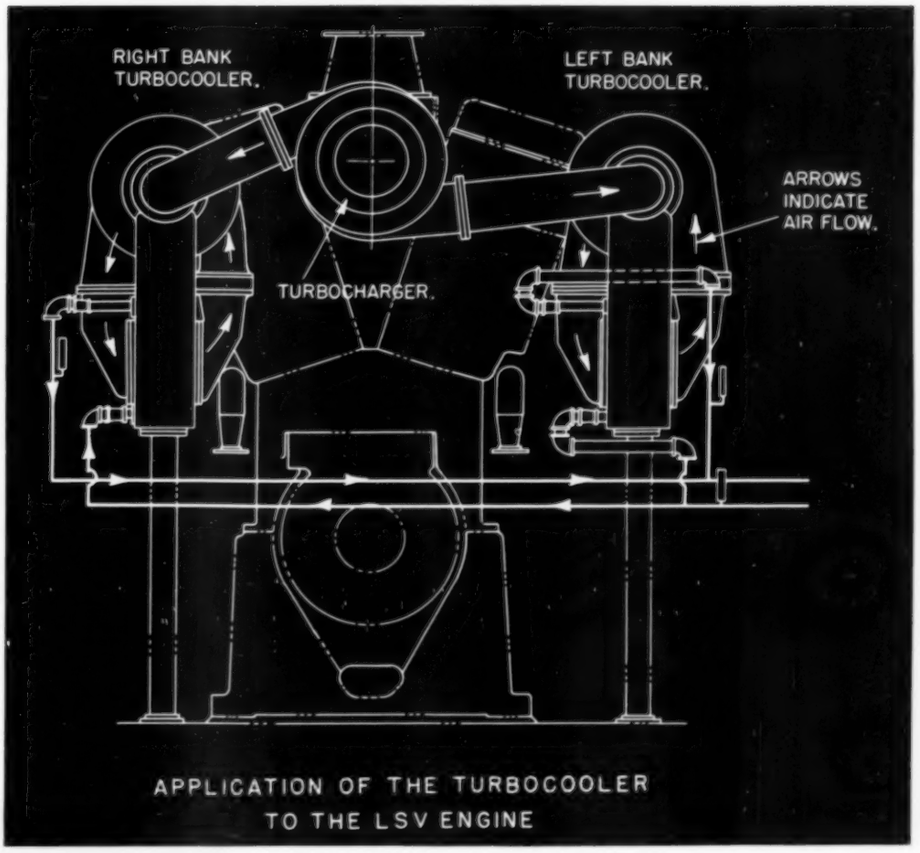


Fig. 5. Schematic diagram of turbocooler mounted on Cooper-Bessemer Type LSV-16 supercharged spark-ignited gas engine.

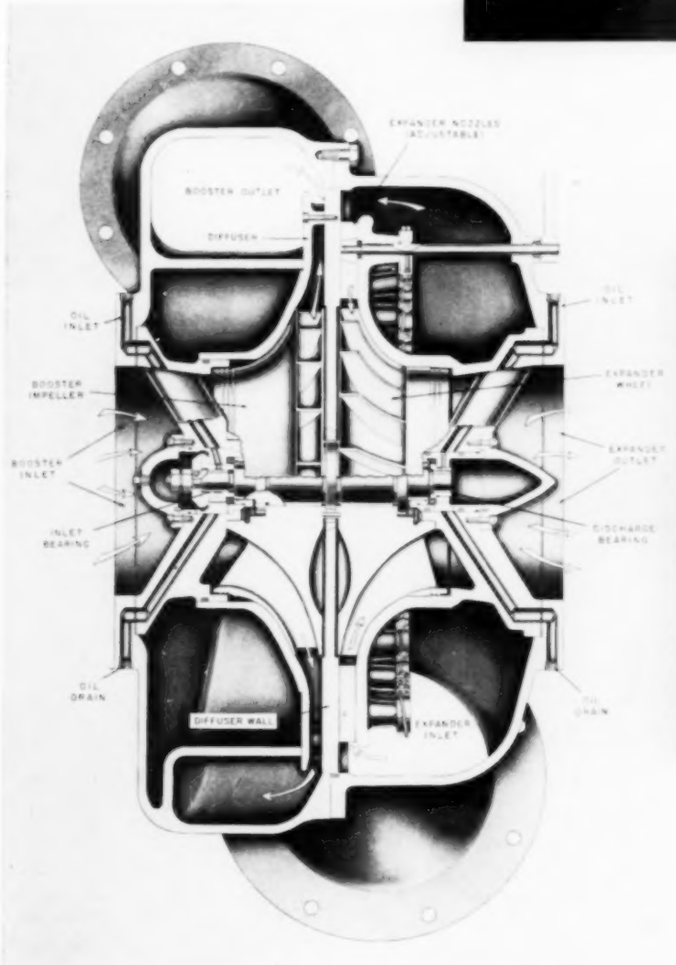


Fig. 3. Cutaway view of Cooper-Bessemer turbocooler.

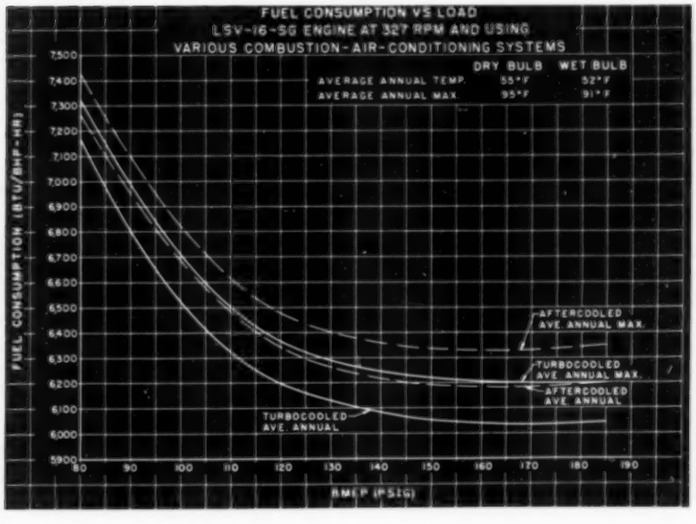


Fig. 4. Fuel consumptions of supercharged spark-ignited gas engine with various air-combustion-conditioning systems.

HUGE SCRAPERS GIVE NEW LIFE TO NEBRASKA HILL FARMERS

Use public roads—after completing a land-leveling job, the huge earthmovers can be moved swiftly over public roads to another one. As this unusual scene shows, they are also used sometimes to tow other equipment during these moves. Here, an International 55 Payscraper, owned by Harold Peterson, Loup City, Neb., races down a road near there with a fuel trailer trailing in its wake.

Once a *hill* farm—The advent of the huge earthmovers on the Nebraska scene proved to be especially beneficial to men whose land contains rolling terrain. Here, we see an example of the bench-level type of land-shaping for irrigation on the *hill* farms. Terraces whose widths vary with the angle of the hillside are built, and shaped at a 2% slope to permit the water to run slowly from the top side to the bottom. A 12-in. berm at the lower edge prevents erosion from irrigation or rainfall.

THE year 1955 was an eventful one for many Nebraska farmers, who have long suffered from irregular rainfall. That was the year huge self-propelled, rubber-tired scrapers made their first appearance on farms in the state to help level the land for irrigation. This innovation has proved to be of life-saving importance to Cornhusker state farmers.

The spasmodic rainfall in Nebraska results either in healthy yields or virtually cropless seasons for the hapless farmers. This condition has meant some tragic lean years for many of these men of the soil and their outlook always carried the memory of the disastrous "dustbowl" days of the "30's". After the "dustbowl" years, a few of the farmers in the area, determined never to undergo a similar situation, investigated irrigation as a solution to the inconsistent precipitation problem. The majority, however, due mostly to lack of funds, hesitated to accept this scientific approach to supplying water for crops. Three dry years in the early 50's proved to be the incentive to stir the farmers into action. They had all the uncertainty they wanted, so they turned to irrigation.

With the surge to irrigation on many farms, the huge road-building type of scraper to level the land became practical and economical. One manufacturer, International Harvester, alone, has sold about 65 Payscraper units, ranging from 14 to 20 cu yds, in the state to be used for land levelling. The self-propelled Diesel earthmovers proved to be a boon, especially, to the farmers who worked tracts that contained hilly terrain. Prior to 1955, the "hill" farmers that had turned to irrigation had been compelled to rely on the expensive sprinkler system, a system that has never proved to be completely satisfactory for growing corn. In 1955, however, after the huge earth-handlers had begun to appear frequently on the Nebraska landscape, a few of these farmers decided to use them on the knobby tracts.

In order to prepare these hillocks for irrigation, an arrangement known as the bench-level system of preparing the land for irrigation was initiated. The method, which permits the owners of farms with undulating terrain to surface irrigate almost as easily as the "flat-land" farmers, was an immediate success. The "upland" farmers adopted this new system in droves. The bench method is a system of level terraces whose widths are determined by the slope of the hillside. Each bench varies 2

ft in height from the adjacent ones. The widths are also controlled by the fact that the farmers must have a distance of 32 ft, 6 in. to plant eight rows of corn. The result is that the benches are 32 ft, 6 in.; 63 ft, 95 ft, 6 in.; or 126 ft wide. This permits, of course, 8, 16, 24, or 32 rows, respectively, to be planted. The benches have a slope of 2 per cent so the water released through gated pipe at the upper side flows gently to a 12-in. berm at the lower edge. This berm prevents erosion, both from irrigation waters and surging waters resulting from heavy downpours. Thanks to the foresight of a handful of farmers in Nebraska who had the courage to experiment with road-building scrapers, that state probably will never again be faced with a drought problem.

Helped modernize Nebraska irrigation —The huge self-propelled rubber-tired scraper, normally seen on construction projects, has proved to be a godsend to farmers turning to irrigation in the Nebraska region. Machines similar to this International 55 Payscraper unit, one of 65 International self-propelled scraper units doing land-leveling work in Nebraska, shapes the land so that water may flow gently over the crops.

TWO NEW ALLIS-CHALMERS DIESELS

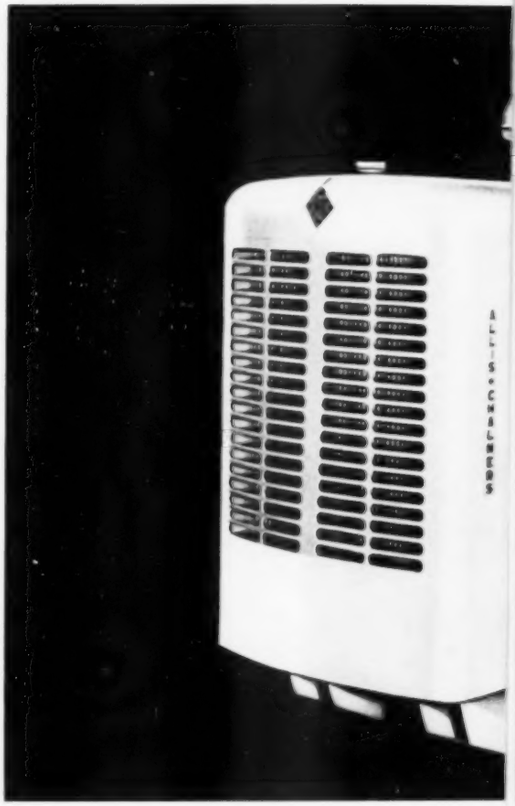
Heavy Duty 88 and 131 Horsepower Diesels Added to A-C Line.

By BRUCE W. WADMAN

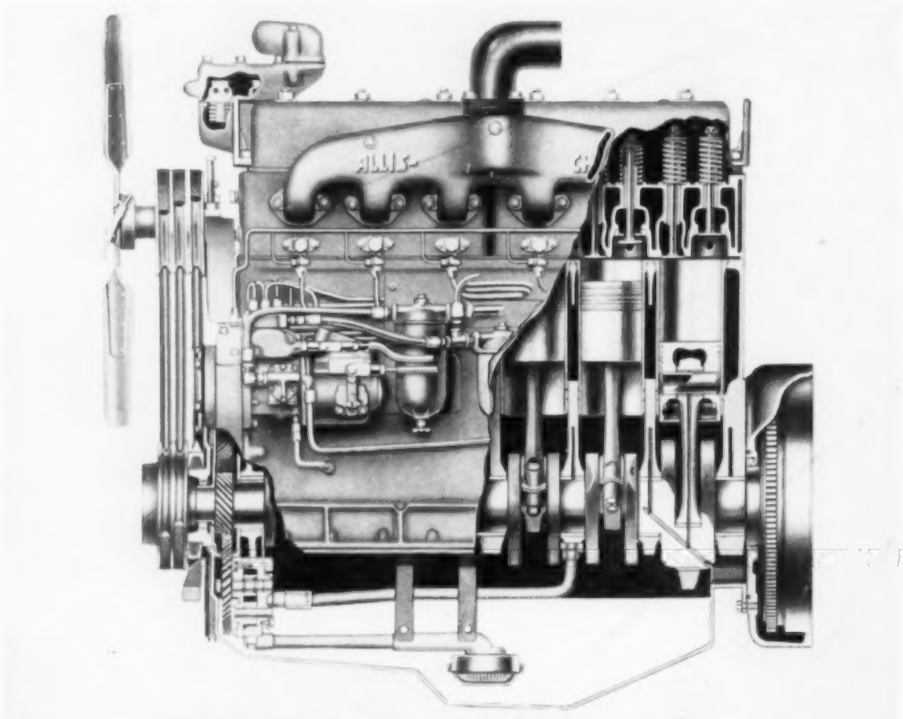
TWO new diesels have been announced by Allis-Chalmers Manufacturing Company, Engine–Material Handling Division. These are the Model D-516 and D-344 diesel engines especially designed for heavy duty industrial aplications. The D-516 is a six cylinder diesel rated 131 hp at 1800 rpm, and the D-334 is a four cylinder diesel, with the same bore and stroke as the D-516, and rated 88 hp at 1800 rpm. Both engines feature Follow-through controlled turbulence combustion for smooth power output and low shock loading of vital engine parts to assure long life in the field. The system utilizes an energy cell insert in the combustion chamber, reducing peak pressures and promoting thorough mixing of fuel and air for complete combustion. The engines also feature extra rugged construction and design throughout in such places as the block, crankshaft, bearings, etc. They are designed for tough, continuous operation in industrial applications with torque, speed and power output geared to the needs of power users, as can be seen in the accompanying power curves. These two engines will be used in pumping service, in equipment for construction and mining, in sawmills, to drive machinery of all types, etc. The cylinder bore is $4\frac{7}{16}$ in. and the stroke is $5\frac{9}{16}$ in. The four cylinder engine has a displacement of 344 cu in. and the six cylinder engine has a displacement of 516 cu in.

The cooling system is of the forced circulation type with positive action by-pass type thermostats for quick warm-up and maintenance of uniform operating temperatures. At rated speed, the self sealing water pump circulates adequate coolant through the engine. The water distribution channels are an integral part of the cylinder block, thus eliminating leaks and directing the water where it's most needed–at the top of the cylinder liner in the combustion chamber area. Cooling water surrounds the entire cylinder liner as well as large areas throughout the head. Full pressure lubrication assures an ample amount of oil at the right places at all times. The heavy duty gear type pump delivers oil to a full flow lube oil filter before oil enters the engine. The automatic oil pressure regulator valve and pressure relief check valve controls the flow of lube oil from oil pump into the engine supply lines and regulates the pressure in the system.

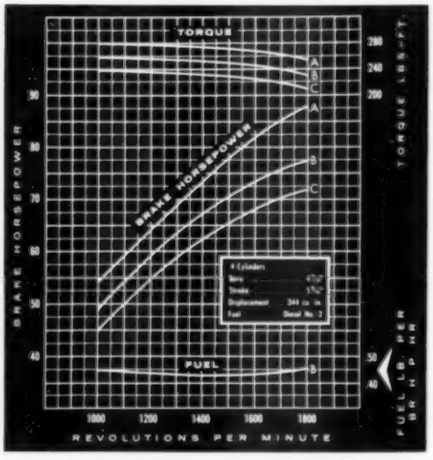
Other important major features of both engines are noted below. Five ring aluminum alloy pistons anodized to resist corrosion, and cam ground for precision fit at working temperatures are standard



Cutaway side view of the D-516 diesel shows major features of this new heavy duty engine.

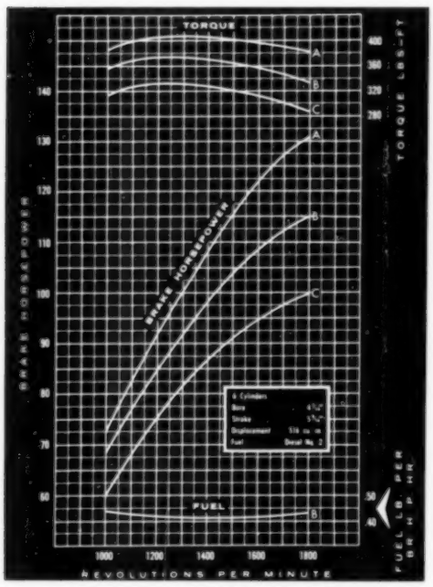


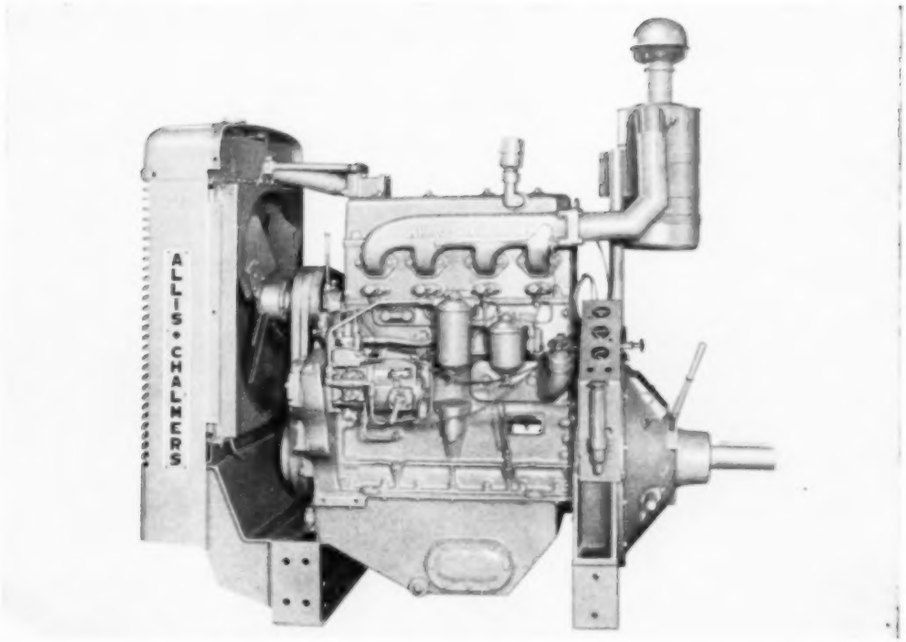
Power curves below and to the right of the two new engines. A is the maximum laboratory performance curve; B is the intermittent duty curve; C is the continuous duty curve. The D-344 engine curves are below and the D-516 curves are to the right.



equipment. Top ring has a hard chrome surface and deep grooves and piston is full floating with snap ring assembly. Valve guides and valve seat inserts are replaceable, and the wet-type cylinder liners are also replaceable. Self cleaning pintle type

Open type power unit of the new Allis Chalmers 131 hp six cylinder D-516 diesel.





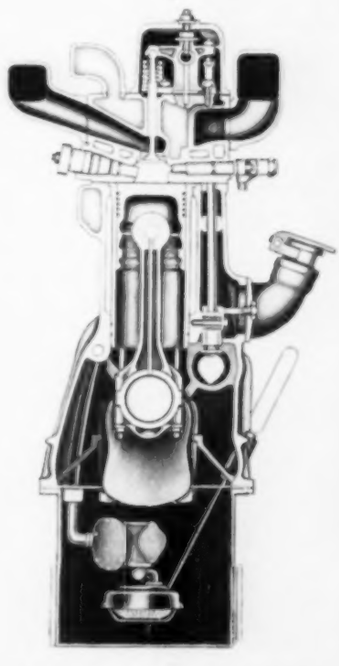
Left side view of the 88 hp D-344 Allis Chalmers diesel as an open type power unit. Note Twin Disc clutch.

injection nozzles and single plunger fuel injection pump are included in both engines. The fuel pump is a single plunger distributor type fuel pump that is dustproof and self lubricating, and contains a governor integral with the pump. Heads on the six cylinder engines are interchangeable. An extra strong block on both engines is made of high strength alloy iron with deep skirt and heavy ribs for rigid mounting of main bearings. The simple timing gear train has only four helical gears for crankshaft, oil pump, camshaft and fuel pump and is contained in one housing. Extra wide main bearings are precision copper-lead alloy type with tin plate surface for quick break-in. The connecting rod bearings are also of the same type as the main bearings. The camshaft, push rod and rocker arm assembly has a minimum of parts and wear points. Only one adjustment is necessary per cylinder. Valve lifter bracket is precision-dowled to the block for lasting alignment. Rocker arm retainer clip holds parts in working position. Fuel is filtered twice, once as it enters the transfer pump and then again before the injection pump to give maximum protection to the fuel injection equipment. Connecting rods are statically and dynamically balanced and are interchangeable. A heavy duty oil bath type air cleaner is provided as standard equipment on each engine. Piston speed at 1800 rpm on both engines is 1669 ft per minute.

Brief Specifications of the two engines are as follows:

	D-344	D-516
No. of Cylinders	4	6
Bore and stroke	$4\frac{7}{16}$"	$5\frac{9}{16}$"
Displacement (cu in.)	344	516
Approx. net weights		
fan to flywheel engine	1625 lbs	2000 lbs
Power unit (open type)	2025 lbs	2400 lbs
Power unit (closed type)	2100 lbs	2500 lbs
Main Bearings ($3\frac{1}{2}$" dia.)	5	7
Electrical Equipment		
Starter	24v	24v
Generator	24v	24v
Overall Power Unit Dimensions		
Width (maximum)	33"	33"
Length (radiator to clutch)	$64\frac{3}{4}$"	$80\frac{7}{16}$"
Height (to top of radiator)	$51\frac{3}{8}$"	$51\frac{7}{8}$"

Head-on cutaway view showing the combustion chamber construction clearly.



REMOTE CONTROL

Remote Controlled Engine-Pumping Units Outstanding Feature of New Crude Line

By DOUGLAS SHEARING

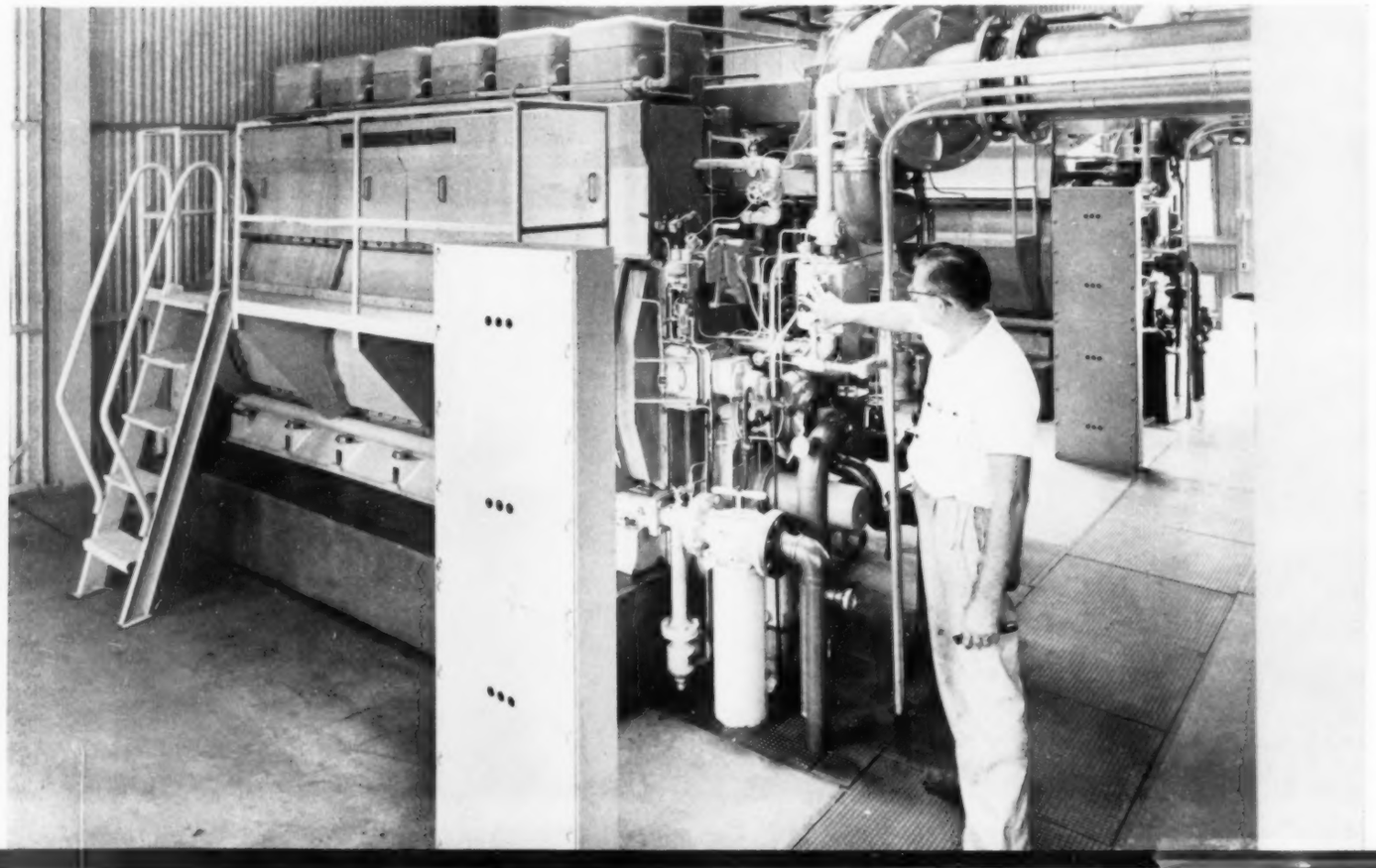
REMOTE control of engine-pumping units is the outstanding feature of two new pipline stations that have been placed in service recently by The Texas Pipe Line Company. Four 960 hp Nordberg engines now operate unattended during the night in two new stations on the East Texas Main Line System. The 12 in. line transports crude petroleum from Northeast Texas to Port Arthur, a distance of 210 miles and has a capacity of 73,000 barrels per day. The two new stations are located near Diboll and Woodville, Texas. Woodville started up on September 5, 1956 and is the newest of these two stations. There are four other stations on this line. Above Woodville, two stations are electric powered and one is a dual fuel station. There is one diesel station below Woodville.

The original Diboll station was destroyed by fire in 1955 and its 1600 hp, four-cycle air injection diesel was removed. Since another station was to be built in a general expansion and improvement program, it was decided to make both Diboll and Woodville the same in all respects and employ two six cylinder, four-cycle turbocharged Nordberg Duafuel diesels in each of them. The new station buildings are of steel construction. Both stations are divided in a way to separate the pumping equipment from the engines and thus confine fire, if it should occur, to the space in which it orginates. The four Nordbergs, rated 960 hp each at 460 rpm, are under push-button control from the master station at Douglass in all respects, except engine starting. Although an attendant starts the engines, preparation for the start is made by setting automatic controls on the board in the station office. The before and after lube oil and cooling water pumps are cycled into operation automatically and the time interval between preparation and start is under automatic control. The attendant admits starting air and observes the start on diesel fuel. After five minutes of running idle on fuel oil, the engine is manually changed over to dual fuel and then placed under the control of the automatic controller. The controller holds the engine speed to the rpm required to maintain operation within the station suction and discharge pressure limits set in the controller.

The engines have attached pumps for jacket water circulation and to maintain lube oil pressure. In the event of excessive jacket water temperature or low pressure on lubricating oil, the engines are automatically shut down, red lights are illuminated on the control panel in the local and remote offices, along with the sounding of the alarm in each office. If the attendant is still present, he immediately checks the cause of the shutdown as indicated on the board and investigates and corrects all possible reasons for trouble before starting the engines again. In addition to the protective devices on the engines, there is a system of alarm and automatic shutdown connected to the line pumps and the step-up gear through which the engines drive the pumps. Suction and discharge pressures are continuously recorded on the central control panel in the office. The controls are set for a maximum of 800 and the minimum 30 psi line pressure.

The rate of pumping at the station varies automatically with the rate at which oil is received into the station. The two units are connected to operate in series. Engine power output is under automatic control to meet pumping demands, but it can be varied by the attendant. Performance in terms of pressure is automatically relayed by telemeter to Douglass. The engines, gears and pumps are equally protected against trouble whether the attendant is present or absent from the station. After following through the initial starting sequence and observing the engine on automatic control, the attendant leaves the unit to the control of the control equipment and the protection to the protection equipment.

Each of the two Nordberg four-cycle turbocharged Duafuel engines is rated 960 hp at 460 rpm. Note the engine room ventilator intakes which surround the exhaust gas pipes.



A diesel fuel oil storage tank, the Maxim silencers and American Air Filter air cleaning intakes are located in the yard behind the Woodville Station. Both new station buildings are of steel construction.

As a whole, the installation is extremely simple. For each engine there is a closed system of jacket water cooled by heat exchangers in the crude oil line with a separate lube oil cooler served from the main heat exchanger and therefore unaffected by the jacket cooling temperature. The jacket water temperature is automatically regulated by a control valve. The purpose of separate flow to the jackets and the oil cooler is to hold lube oil temperature below jacket temperature. Lube oil is continuously pumped through a fullflow filter. A similar filter of smaller size is placed in the pilot fuel system ahead of the engine. Since the gas fuel supply is of commercial quality, no scrubber is needed. Pilot oil is regular diesel fuel stored in an outside storage tank.

Starting air pressure is maintained automatically by an electric motor-driven, two-stage, air-cooled compressor. Fresh water for makeup in the closed cooling system and for other purposes is supplied by an automatic pump from a well on the station site. This water is treated to remove scale-forming impurities before it is added to the closed cooling system. There is very little loss of water and addition of makeup water is infrequent. Conventional systems of air cleaning and exhaust silencing are employed. There is a separate instrument panel in the engine room for each engine with gauges to show pressures of cooling water, lube oil and starting air, also oil and water temperature. An exhaust temperature pyrometer is also on this panel. The step-up gear is connected to the crankshaft through a flexible coupling. The pump is driven by the high speed pinion in the gear set which has a power rating of 920 hp and ratio of 460 to 3580 rpm. The centrifugal pump has a rating of 2760 gpm, 1082 psi at 3600 rpm. Pumps and gears are separately lubricated. The oil system includes edge-type oil filter and shell-and-tube type heat exchanger.

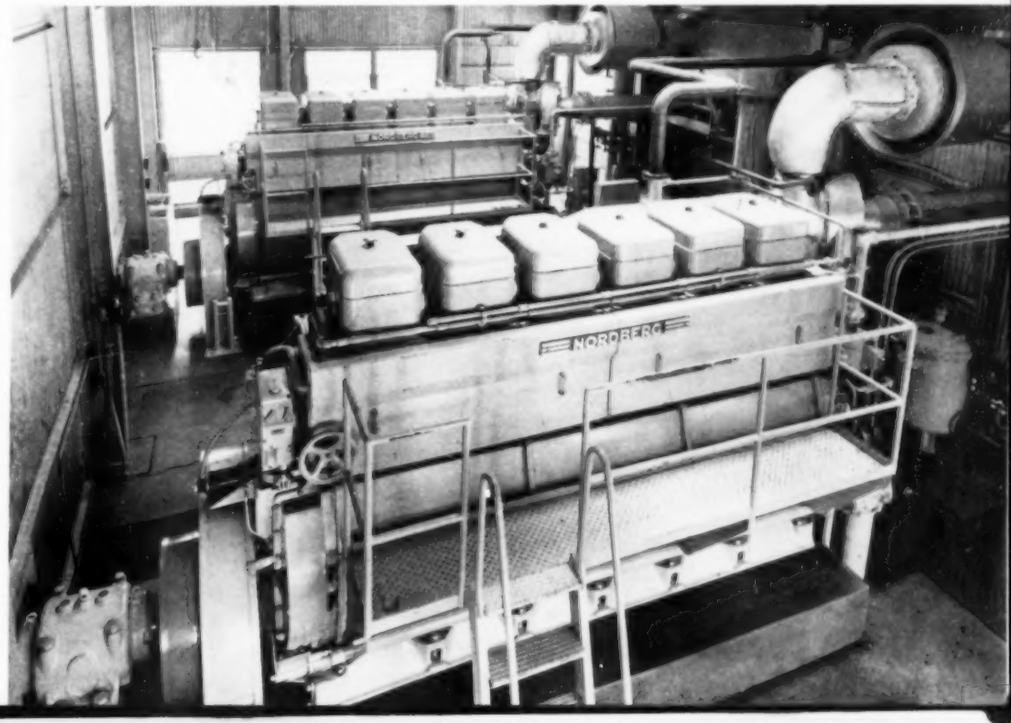
There is a scraper detection unit in the main line which lights a lamp and sounds an alarm at the local station to alert the attendant of the approaching scraper. The detector is approximately 5000 ft up stream from the station, thus allowing the attendant to: stop his units; open the main line block valve; and close the suction valve. (This prevents paraffin and other debris from entering the pumps). The East Texas Main Line System is owned in undivided interest by Cities Service Pipe Line Company, Tidal Pipe Line Company and The Texas Pipe Line Company and is operated by The Texas Pipe Line Company. The imaginative engineering advances made in recent years by the pipeline industry are impressively evident in the Nordberg engine-pumping units installed in these two new stations.

Equipment—East Texas Main Line System

Main engines	(4) 960 hp, four-cycle, 6 cylinder, 13 x 16½", 460 rpm, turbocharged Nordberg Duafuel Diesels.
Step-up Gears	Worthington
Main pumps	United Iron Works
Governors	Woodward
Air filters	American Air Filter
Silencers	Maxim
Temp. controls, jacket water and oil	Robertshaw-Fulton
Jacket water coolers	Alco Products
B & A oil pumps	De Laval Steam Turbine
B & A water pumps	De Laval Steam Turbine
Starting air compressor	Quincy
Turbochargers	Elliott
Fuel filters	Commercial Filters
Pyrometers	Alnor
Pressure filters	Nugent
Gear oil coolers	Ross
Gear oil filters	Cuno

Control Systems

Telemeter system	Bristol
Supervisory system	Control Corporation
Signal relay panels	Westinghouse
Speed controls	Hagan
Pressure recorders	Mason-Neilan
Electric tachometers	Weston



The two Nordberg engines operate unattended after they have been started up by the attendant and the centrifugal pumps are put "on stream". The pumps and step-up gears are on the opposite side of the fire wall.

front of the bumper to the rear of the single axle

body is a Kenworth design of all-welded steel con-

MORE ON BORON*

The Cummins turbodiesels work in extreme dust conditions—both on the quarry floor and on the high desert where the mill is located. To assure them that only clean air enters their engines, company executives had dry-type after-cleaners installed between the usual oil-bath air cleaner and the turbocharger. The vertical unit is the Vortox oil-bath and the horizontal, the Purolator dry-type air cleaners. All these units are equipped with Perry water filters; Nugent and Luber-finer lube filters; Fram fuel oil filters.

DIESELS do what mules did with the borax ore at the new $20,000.00 mine and processing plant which the United States Borax & Chemical Corporation dedicated in Mid-November.

Starting 80 years ago, borax became firmly identified with twenty mule teams, but today Cummins Diesels have taken over the hauling of the ore from pit to crusher. And, after the first of the year, Cummins engines also will be removing the overburden we are told.

When the company began the gradual conversion from underground to open-pit mining at the hugh borax deposit near Boron, California, twelve Model 802 Kenworth rear-dump trucks were purchased and put to work. All are powered by 300-hp model NRTF-6-B Cummins turbodiesel engines, operating through Allison Torqmatic transmissions.

When company officials decided to strip overburden with their own equipment, they specified Cummins in the Euclid tractors which will pull eight belly-dump dirt wagons and one sprinkler. These units will go into operation approximately January 1, 1958.

The ore body lies at from 137 to 170 feet below the surface, and more than 9,000,000 tons of earth was moved—by private contractor—before the open-pit operation became possible.

**For more details on this very interesting operation, we refer you to pages 19, 20 and 21 of the January, 1957 issue of DIESEL PROGRESS.*

A view of the Cummins-powered truck on the ramp at the crusher. The Kenworth rear-dumps are of 24-ton capacity. Round trips from shovel to crusher to shovel are 14,000 feet, half of it upgrade, loaded. The trucks climb from 2250 to 2460 feet.

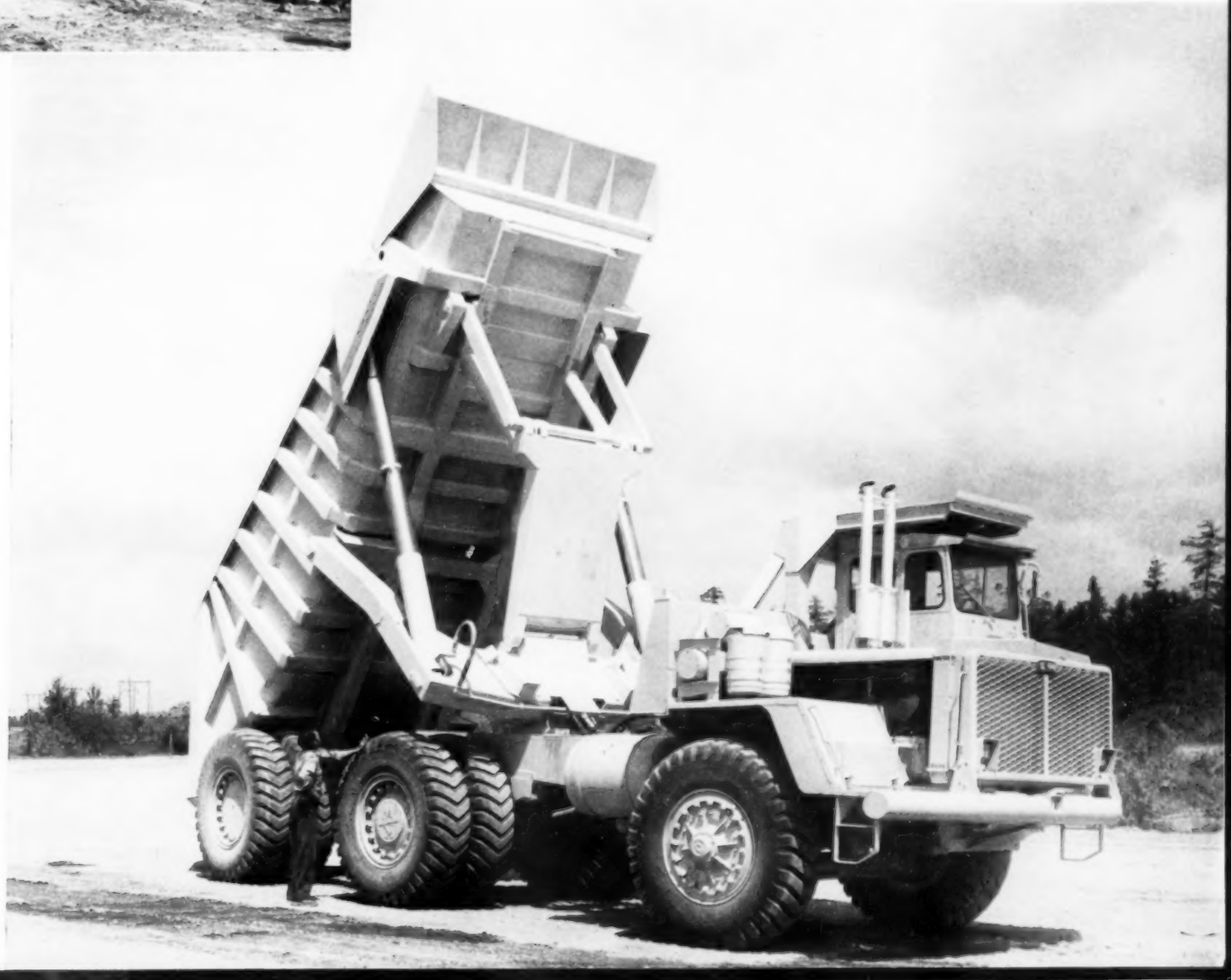
MORE TRUCKS FOR KAISER

THE newest and largest member of the Kenworth family of rock and ore movers—and probably the largest rear-dump semi being built today—is now coming off the production line. It is the 803-B with a rated pay load capacity of 64 tons or 40 cubic yards struck. The first ten Kenworth 803-B's have been purchased by Kaiser Steel Corporation for use on ore hauls at Kaiser's Eagle Mountain iron mine near Indio, California, it is announced by R. D. O'Brien, vice president and general manager of Kenworth Motor Truck Company in Seattle. The new 803-B's gross vehicle weight rating of 228,000 pounds is indicative of the huge size of this latest Kenworth rock and ore mover. Powered by a single 12-cylinder Cummins diesel engine, it will be offered with either the 400 or the 600 horsepower version of this engine. The 803-B tractor has front and rear axles of Carcometal, a special high-strength cast steel. Front axle capacity is 50,000 lbs and rear axle capacity is 100,000 lbs. Measuring 41 feet, 11 inches from the

front of the bumper to the rear of the single axle semi-trailer, the 803-B has a turning radius of only 37 ft with a turning angle of 30 degrees. The tractor wheelbase is 168 inches. The double-core radiator has an area of 2,100 square inches or 2,800 square inches, depending on the engine specified. The 18:00 x 33 tires used on all axles are approximately six ft in diameter.

The Kenworth-designed drive axle is full-floating double-reduction with the first reduction a spiral bevel drive unit and final reduction through planetary gears in each wheel. Securely mounted in rugged frame brackets, the rear springs are positioned by the use of steel and resilient pads. The side-by-side dual front springs are rubber-mounted at both ends and have 15 leaves per spring. Steel seats adjacent to the rubber pads at both ends of the springs shorten their effective length under load. In a loaded position, the rubber block is relieved by flattening of the spring arch. Unloaded, the front spring ends ride on rubber. The dump body is a Kenworth design of all-welded steel construction, having strong bracing through box-section ribs and longitudinal reinforcement between the ribs at the body sides. Dumping action moves the tractor back and under the trailer as the entire trailer raises. Pin-type construction of the fifth wheel insures stability in dumping and in over-the-road hauls. A body guide and equalizer stabilizes the body during dumping. The fast-acting telescopic hoist, a patented Kenworth design, is single-acting, two-cylinder, three-stage, straddle-mounted. The new one-man offset cab offers maximum direct vision in all directions, and is enlarged in all dimensions, providing increased headroom and increased ventilation. In addition to two front ventilators, a rear ventilating window and a hinged front quarter-window at the right side are incorporated in the cab design. "Record size, maneuverability and rugged resistance to wear, combined with a comfortable ride for the driver, were the underlying considerations in the design of Kenworth's new 803-B," said O'Brien.

Ten of these new Kenworth diesel trucks have been added to the big fleet of diesels at Kaiser's Eagle Mountain iron mine near Indio, California. Cummins NVH-12 diesels are on all ten units used in this huge strip mining operation.

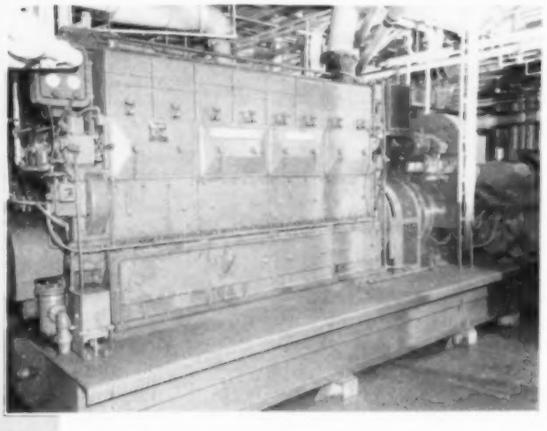


DIESEL ELECTRIC UNITS POWER DIXILYN'S OFFSHORE MOBILE RIG

By DOUGLAS SHEARING

A NEW mobile drilling platform for Dixilyn Drilling Corporation is equipped with White Diesel Engine Division's diesel electric drilling package. Christened the *Julie Ann*, the unit's operational headquarters is at New Orleans, Louisiana. Designed for deep drilling its three 175 ft legs will allow it to work in a wide variety of offshore locations, according to R. G. LeTourneau Inc., designers of the platform. It can drill 6 holes from one location because of its special derrick design. The White Diesel concept of diesel-electric drilling power includes engine-generator sets with power output gathered into one small switchboard—a portable power cubicle for land or offshore operation, and a driller's control panel which attaches above the usual rig control console. Concentration of power in electric apparatus of high output design saves weight and eliminates extra linkage of smaller motors. This works to the drilling contractors advantage on land or offshore. Equipment is completely packaged and tested at the White Diesel Factory in Springfield, Ohio. The 2500 hp drilling equipment meets the owners special requirements to direct 2000 hp through the National 1625 drawworks or 2000 hp to the mud pumps. The three White main power units are Superior PTDS-8 engines rated 834 hp at 900 rpm, and are cooled with sea water through heat exchangers. One White-Westinghouse generator is direct connected to each engine and each engine drives mechanical rig equipment as well. An American Blower Gyrol fluid coupling is connected to the generator stubshaft and delivers power from the engine through a compound to the pair of 1000 hp mud pumps. A mud mixing pump with single electric motor and the electric powered drawworks comprise the electrical load met by the three PTDS-8's. With two 1250 hp White-Westinghouse motors on the drawworks, the requirements for hoisting are easily met. Power from the three engines may be applied as required to hoisting or drilling operations.

In satisfying their own drilling requirements Dixilyn wanted to use the features they considered desirable in both mechanical and electric rigs. The Dixilyn preference was dictated by their large mud pump requirement and their variety of speeds for working various depths and mud programs. They were able to satisfy their needs by compounding all three engines for mechanical drive of a pair of 1000 hp mud pumps, locating them on the main machinery floor, which is the second deck of the LeTourneau platform. By remote control of engine speed a driller can produce as much or as little mud as he desires. Inboard of the compound and Gyrol drive, the White-Westinghouse dc generator delivers high torque at low speed and the total output from one of the three generators would meet electric load regardless of operating speed while drilling. In hoisting, the full output from each of the three generators on the three PTDS-8's would be available to the drawworks, since the G-1000 mud pumps can be isolated by dumping the oil from the Gyrol. The third mud pump can be disconnected and power from all the generators will then meet demand at the drawworks if needed. Mud mixing tanks and dry storage of 10,000 sacks of mud adjoin the machinery room on the same level. Supply for the Halliburton dual T-10 cementing unit is 1700 sacks on this deck level. Up on the movable drilling floor, two high output White—Westinghouse motors are able

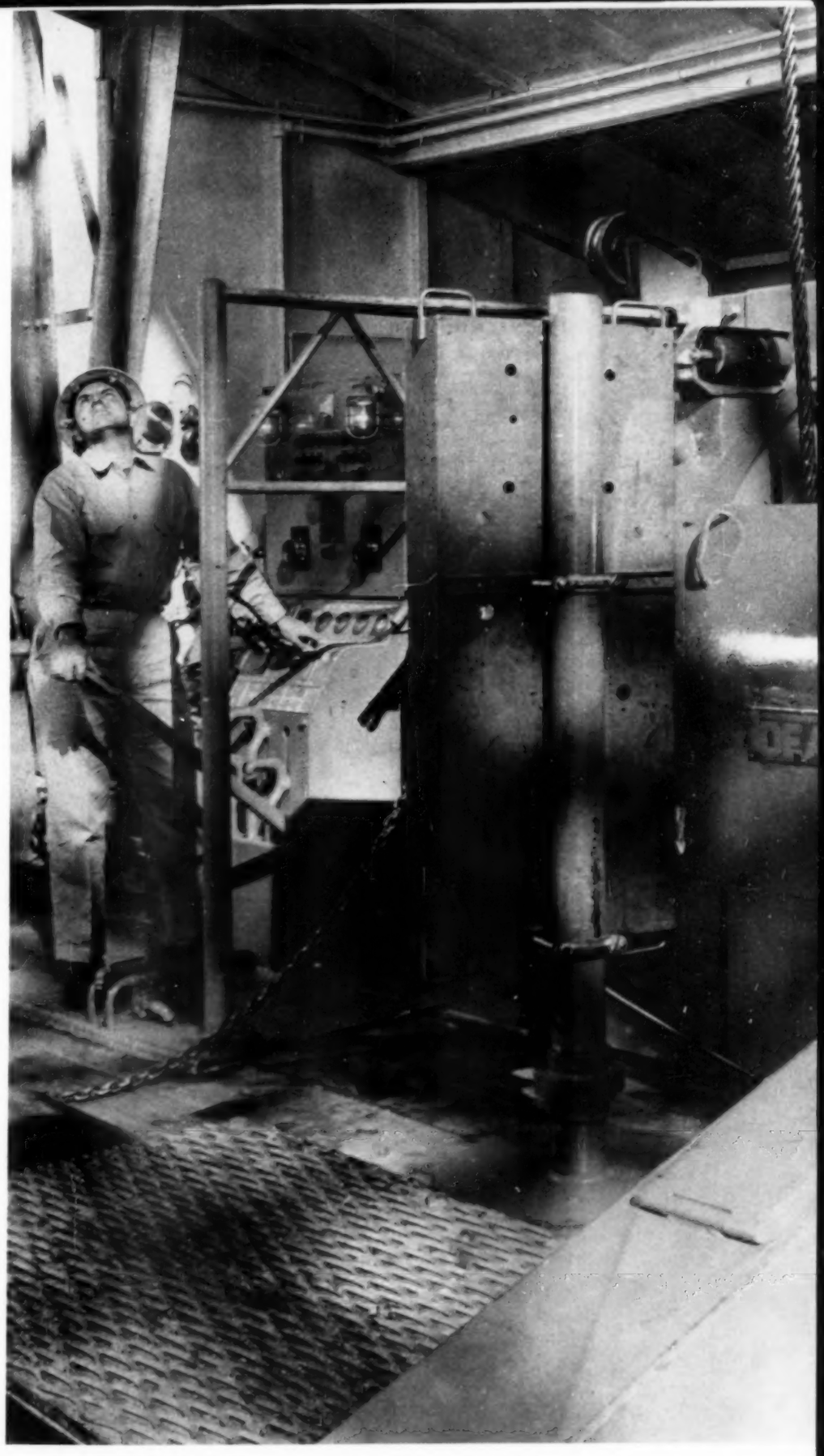


One of the three White Superior 834 hp diesels installed on the Dixilyn offshore mobile rig, the *Julie Ann*.

to handle the drawworks easily, for they can carry a 2500 hp load. This is made possible by the 6 pole heavy duty construction. The rotary table is driven mechanically from the drawworks in the usual way. Interchangeablity of motors is afforded by using identical units on the mud pumps and drawworks.

The simplicity of the diesel electric package is not altered by the combination of mechanical equipment. Power demands are cleanly divided between drilling, pumping and hoisting. Concentration of power in the large White-Westinghouse 371-A motors achieves high output with a minimum of space required. Engine-generator sets retain the high output minimum weight concept. Gyrol drive and chain compound, once aligned, present no further problem in a mobile platform which indicates why Dixilyn remained with chain drive in this part of the floating rig. The simple power controls for the driller are included on a panel mounted with the conventional rig console stand. Control of the circuits, circuit alarm system and master switches are all conveniently mounted for the driller's reference. A White designed *Variac* is the master power control, operated by hand or by foot, for easy adjustment of the flow of electric power to the load required. Though several miles of drilling pipe may be down, the smooth load carrying characteristics of the dc motor will achieve an easy pickup off the bottom of the hole.

The LeTourneau drilling platform with its 175 ft spuds, will permit operation in deep or medium depths offshore. Mud pump capacity and the large drawworks will allow drilling in depths over 20,000 ft. The improved design of the brace pipes in each spud gives extra rigidity for deep water work. The mobile rig thus becomes a model for a unit that will drill at almost any depth and in the waters now being worked off the Gulf Coast. The drilling of one to six holes from one spot was a specific demand of the Dixilyn Drilling Company upon the equipment manufacturers. The 140 ft derrick is designed with a 30 ft by 40 ft base. Crown block is rated 525 tons and is movable. The main deck of the LeTourneau platform contains a massive pair of tracks to skid the entire drawworks and derrick out to the drilling position. As a result the bit can be moved over a 7.5 ft by 10.0 ft area at the direction of the tool pusher. This allows good hole separation, and directional drilling accomplishes the spread desired in the pay zone. The special substructure, fabricated as one piece by Avondale Marine Ways and barged to Vicksburg, for assembly at LeTourneau's yard, will support the drilling floor and machinery yet allow plenty of room for completion of the additional holes. Blowout preventers will be handled on the trolleys built into the substructure. Locations of the shale shaker and the mud laboratory on the main working deck are to either side of the main tracks on which the drilling platform moves out to working position. 25,000 ft of drill pipe can be stored on deck and 25,000 ft can be racked in 90 ft stands in the derrick, according to Mr. M. O. Boring, Jr., President of Dixilyn Drilling Corporation. Extra pipe and other supplies are brought aboard by one of the two 300 foot-ton cranes located at deck edge. This rig is now out on location in block 21, 25 miles off Grand Isle, Louisiana.



White designed driller's control panel fits conveniently above standard rig control console for ease of use by the driller. It is situated above the driller's left hand in this installation.

DIPPER DREDGE DOUBLES OUTPUT OF SAND AND GRAVEL

This new and radical 1½ cubic yard dredge at Oil City, Pa. raises 850 tons a day from the Allegheny River bottom. Its owners say the diesel-electric equipment digs deeper, reduces downtime and makes it possible for four men to do the work of six.

WHEN a sand and gravel supply company whose main supply of material depends upon river dredging equipment wishes to step up production, it is time to do one of two things. The company can either purchase new and often costly equipment or else improve upon its existing equipment. The Oil City (Pennsylvania) Sand & Gravel Co., which has been processing and marketing coarse and fine aggregates from glacial deposits in the upper Allegheny Mountains for many years, did both. In dredging from the bottom of the Allegheny River there, the company's old bucket ladder dredge was having serious troubles that made dredging operations uneconomical. In the first place, it could not handle large rocks and, therefore, had to move around a lot to bypass these rocks. Secondly, it could work no more than 20 feet (and then only under excellent conditions) below the water. Because of the rocks, Oil City Sand & Gravel Company had to pass over large areas of usable materials and lose an unnecessary amount of time in moving the dredge from one working position to another.

When Oil City decided to shop for a dredge that would suit its particular needs, it was not easy to find a manufacturer who would engineer and build to its specifications. The Ellicott Machine Corp. of Baltimore, Md., however, after studying the situation carefully, offered a means of nearly doubling the company's production of sand and gravel by building a new dredge on to the existing hull. Upshot is a 1½ cubic yard dipper dredge, a rare arrangement for river barge work, which makes use of Oil City's 35 x 130 x 5 foot hull. Equipped with the latest electrical power and controls, the new unit has run production up to 850 tons in an eight-hour day, greatly reduced the amount of time spent in re-positioning and cut the necessary labor force from six men to four. The new dredge is made up of four basic units: (1) A complete front assembly for a diesel-electric powered dipper. (2) Hoisting equipment. (3) An electrical dc generator. (4) A control system for operation of the front assembly and another for operation of the "pin-up" or spud equipment. Certain other items, such as the screening and washing plant, were salvaged from the old dredge and incorporated into the Ellicott installation.

Ellicott's dipper bucket is shown breaking water with a load of river bottom deposit. The dredge works up to 23 feet below the surface of the water. The dipper stick is 36½ feet long overall.

A large rock is hauled out of the water and is about to be dumped back into the river where it will be out of the way. This view, from the operator's position, shows the shipper shaft saddle block and brake wheel.

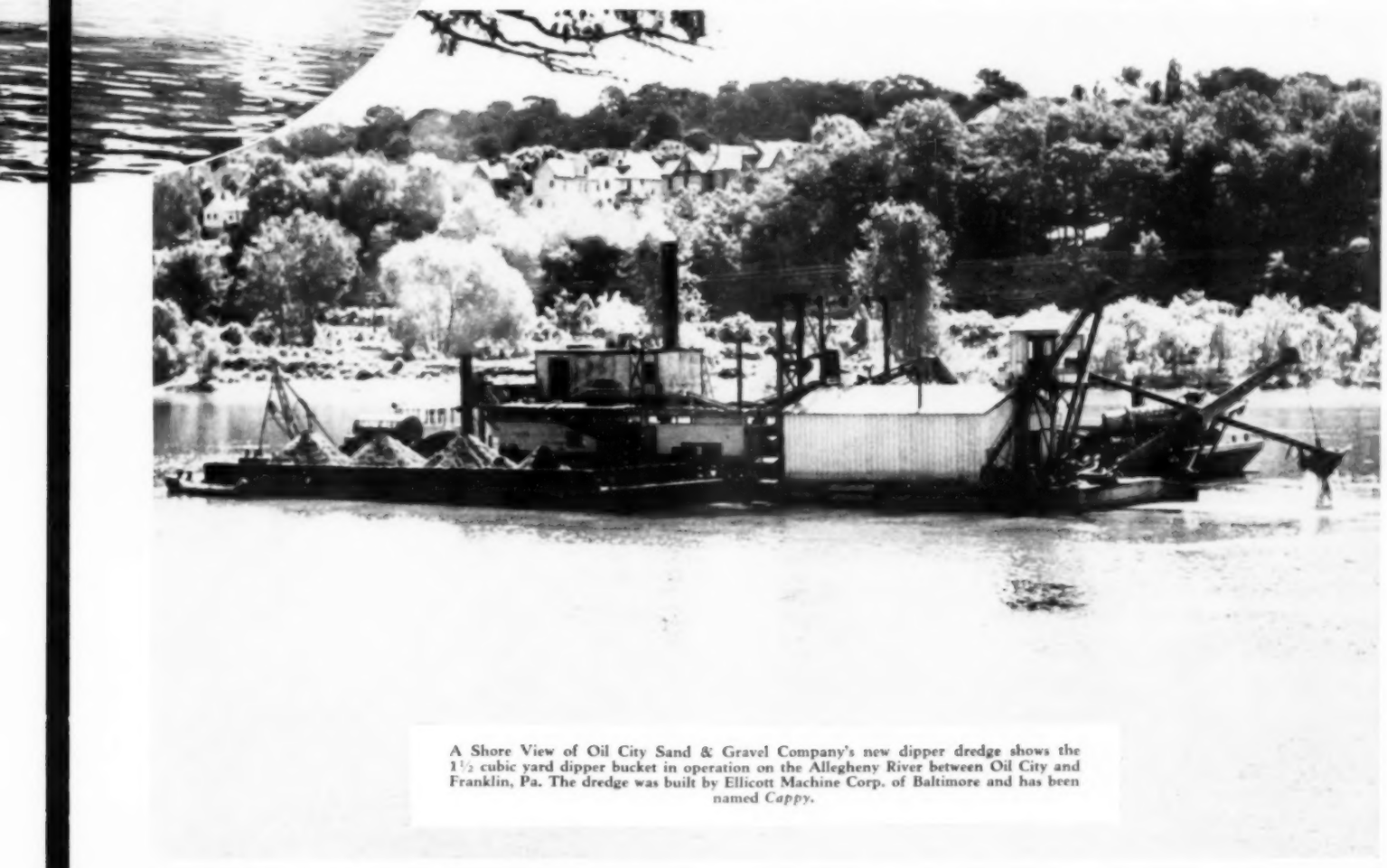
The new dredge is able to dig to a depth of 23 feet. Large rocks, which comprise a considerable proportion of river-bed material in this area, now present no problem. They are lifted in the dipper, or shovel, and discarded into the river at another point. Whereas the old dredge lost much of an available deposit, the Ellicott equipment works away efficiently at the same river-bed formation until it is essentially depleted. The former dredge required 15 moves to accomplish the same amount of work that a dipper can do in one. The dipper can make a "pass" every 70 seconds, even in exceptionally hard digging. Its heavy weight gives a crowding action which forces it firmly into the formation to be raised. Such action was not possible with a chain bucket arrangement. Further

benefits resulting from the new dredging operation have been lower maintenance costs and a reduction of downtime repairs. After the first few months of operation, Charles A. Smith, a partner in Oil City, estimated that overall savings were "considerable."

Materials are now processed on the spot as follows: The dipper dredge drops the load into a dump pan in 1½ cubic yard bites. The load then flows through a "grizzly," where larger stones are separated and dropped back into the river to form a cobble well. Rocks smaller than eight inches are carried on a 30-inch conveyor belt laid at a 12-degree angle, which is believed to be most ideal for the four to eight-inch rounded material. Whenever market demands warrant, material from two inches plus is conveyed from a three-deck screen to a 10 x 36 inch jaw-type crusher. The product of this crusher is returned to the main screen, thus completing a "closed" circuit. Finished gravel from the screen is conveyed to a gravel barge on a 24-inch flat belt, while virgin sand is carried to a sand drag by means of a flume. In the drag, the sand is de-watered and carried to a sand barge on 18-inch herringbone-type conveyor belts.

Ellicott's dipper dredge is powered by Cummins diesel engines driving both an ac and a dc generator. One generator is a 50 kw of 250 volts and 200 amps for operating the main hoist, and the other a 10 kw for the lateral swings. One of the most efficient and unique features of the power and control equipment is the Ward-Leonard system of excitation control for the dc motors on the main hoist and swinger. Also unique is the Westinghouse air control valve on the crowd brake as well as a solenoid air control on the bucket trip. The Ellicott dipper dredge is designed for one man control. The operator manipulates the dredge hoist and trips the bucket with his right hand control, swings with his left hand lever, operates the crowd brake air control with his right foot and operates the drum controller on the back haul with his left foot—all while sitting in a chair. For the pin-up equipment there is a separate set of controls inasmuch as pin-up operations are performed less frequently. The pin-up not only steadies the dredge but shifts its position when a change of location is needed. Large moves are made with a tug. The Ellicott dredge, together with auxiliary equipment, is mounted on a Dravo hull of the boot-jack type.

Oil City had to work out a complicated problem in converting the raked bow of the old hull to a square bow because dry dock facilities were not available. How it was done: Barges were laid alongside the hull and the old ladder was placed atop the assembly. The barges were then flooded and the assembly was tied up with 2⅛" cable while 50-ton steam boat ratchets were used to take out slack. Once the barges were pumped out, the end of the hull could be floated so that bow changes could be made. With the new equipment, the company expects service to customers will be greatly expedited. The river operations are carried out eight to ten hours every day, six days a week. The company's plant at Oil City operates about nine months a year, depending upon river and weather conditions.



A Shore View of Oil City Sand & Gravel Company's new dipper dredge shows the 1½ cubic yard dipper bucket in operation on the Allegheny River between Oil City and Franklin, Pa. The dredge was built by Ellicott Machine Corp. of Baltimore and has been named *Cappy*.

VENEZUELAN DREDGE

By ED DENNIS

FLORIDA has provided our "Good Neighbor" with a hard working dieselized dredge. Venezuela opened its bag of gold and is building a rival to Miami Beach at Ciudad Balneario Higuerote on the blue Caribbean for Venezuelans, and tourists alike, to enjoy. Judging from developments of the last few years, Venezuela is not going to be content with just being oil and iron rich, the country is making a firm bid for its share of the Caribbean bound tourists.

Few countries, in the world today, could match the rapid transformation now under way in oil rich Venezuela. This transformation takes money and of that, Venezuela has plenty. During the past four years the government has invested over 1,608,-600,000 dollars in public works, which amounts to almost 54 per cent of the national income. Now it appears destined to enjoy a new injection of income into its spectacular prosperous economy, namely the "Tourist Trade". This new beach resort, now being developed, runs 8 miles along the northern coast of Venezuela on the shores of the Caribbean. The developers hope it will be another Miami Beach. The developement calls for the dredging and construction of canals for small craft.

At Varadero there will be facilities for construction and maintenance of yachts and various other craft. At Islas y Lagunas, private homes will be constructed. The hotel section will have bathing beaches while at the commercial section a Museo O Instituto Oceanografico will be built. Dade Drydock, of Miami Florida, built the latest dieselized dredge working on this vast land development project. From drawing board to the finished dredge, the shipyard concentrated on standardization of the essential gear machinery so as to lessen the costly down time of routine and emergency work.

The dredge is a scow type of all welded steel construction with a bottom plating of one quarter inch. Plating elsewhere is three sixteenths. The hull consists of pontoon sections bolted together to form a dredge measuring 44 feet long, 18 feet wide and 5 feet deep. The dredging machinery is mounted in the center section. The dredge pilot house is constructed higher than the pump and engine room, thereby permitting the operator to view and direct all dredging operations. Construction also allows it to be removed when the need warrants it.

The ladder is constructed of steel beams reinforced with brackets and face plates for continuous heavy duty digging to a depth of 20 feet. The spuds were constructed of #12 extra heavy pipe with points welded to the ends while the swing gear is of the 5 drum in line type with manual clutches. The cutter head was provided with removable blades to lessen the expense in maintenance.

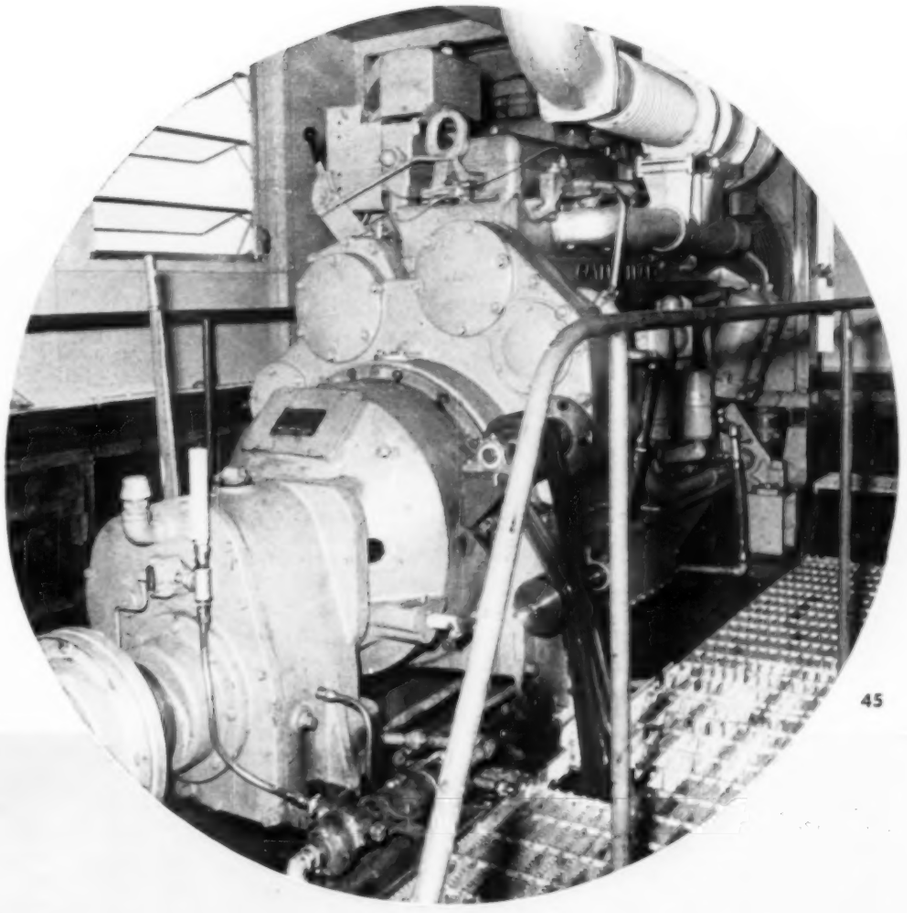
In designing the *Catia*, Dade Drydock Co., selected a D353 Caterpillar diesel engine because of realistic horsepower rating and outstanding dependability for getting a rough and tough job done. The 12x10 Georgia Iron Works main pump is connected to a supercharged Caterpillar 4 cycle model D353 series C diesel engine through a Cotta 1.68:1 reduction gear and a Falk flexible coupling. This engine with a bore and stroke of 6¼x8 in. develops a continuous 290 hp. It is of the stationary type with radiator cooling.

The cutter and hoist engine is a 3 cyl General Motors series 71 diesel developing 60 hp at 1500 rpm. A Maxim silencer is installed in the exhaust system of this diesel. The auxiliary light plant is a 6.5 kw Petter 115 volt ac diesel generating unit and

At top the 10 in. discharge end of the pipe delivering about 150 yds of rock and sand per hour.

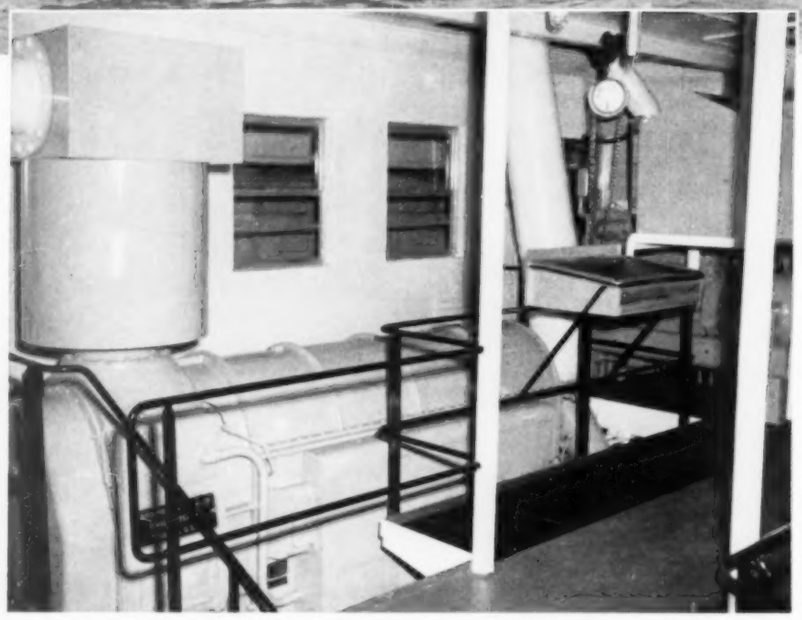
is used for interior lighting and for the flood lights used during night dredging operations.

The Georgia Iron Works pump handles a mixture of water and whatever constitutes the sea bottom where operations are in progress. The usual bottom is light rock and sand plus a lot of root matter. Its capacity is about 150 yards an hour depending on the material dug. The pump has removable liners and sleeves, a cleanout box is provided in the suction pipe and a flap valve in the discharge end. The *Catia* has been in continuous operation since its construction in Miami several months ago and has been successful in moving more yardage per horsepower than the other two dredges being operated on this project.



The model D353 Caterpillar diesel engine has a continuous hp rating of 290. Cotta 1.68:1 reduction gears and a Falk flexible coupling plus S. K. F. bearing helps deliver the power to the pump.

The 44x18 ft dieselized dredge *Catia* hard at work near Ciudad Balneario Higuerote, Venezuela, S. A. It was designed and built by the Dade Drydock Company in Miami, Florida.



Upper engine room showing one Fairbanks-Morse main engine.

M/V *H. B. JORDAN*

THE *H. B. Jordan*, named for H. B. Jordan Executive Vice-President–Operations, United States Steel Corporation represents another milestone in the construction of inland waterways towing vessels. The *Jordan* is also another "first" for the designers and builders, the St. Louis Shipbuilding & Steel Co. of St. Louis, Missouri. The first towboat with a stainless steel hull was the *U.S.S.-1* a recently completed harbor boat of 600 hp built for United States Steel by St. Louis Ship. The *U.S.S.-1* being a harbor boat had no quarters while the *Jordan* represents a complete towboat with air conditioned quarters for a crew of 15 and the largest stainless steel hull built to date.

The *H. B. Jordan* has a hull 120 ft x 27 ft x 9 ft-0 in., with a 6 ft-6 in. operative draft and is a typical "Pittsburgh Pool Boat" in outward appearance. The big and important difference from the many other boats operating in the coal trade on the "Mon" is that every bit of steel exposed to water below the main deck is stainless. All hull plating including that of the modified scow bow is stainless. The streamlined rudders are stainless as well as the stern tubes and cast struts. The propellers furnished by Avondale Foundries are cast of stainless steel. Even the propeller shafting was forged of stainless by U. S. Steel while the two inboard sea chest compartments were constructed of stainless steel with removable stainless plate strainers.

The *H. B. Jordan* is powered by two Fairbanks-Morse marine diesel engines, model 38D8-1⅛M four cylinder opposed piston, 8⅛ in. bore, 10 in. stroke each rated 640 hp at 720 rpm. Each engine drives a four blade 80 in. diameter propeller through a Hindmarch–DeLaval 2.76:1 reverse reduction gear. The Fire, Raw Water and Sea Chest piping is of Saran lined pipe and fittings furnished by The Dow Chemical Co. The two heat exchangers have stainless steel tubes. The electrical power for the *H. B. Jordan* is furnished by two General Motors 75 kw diesel generator sets of 3/60/120/208. A deadfront switchboard provides for generator control and power distribution. Power for the two Carlisle & Finch 19 in. Arc "Dipper" Searchlights with electric controls comes through two Norma-Hoffman rectifiers.

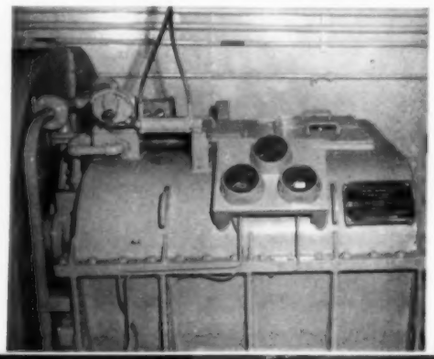
The *Jordan* has all the customary cast steel deck fittings and roller chocks. The forward deck has two Schoellhorn-Albrecht 10 hp double barrel capstans with brakes, while a Schoellhorn-Albrecht 7½ hp single barrel capstan is recessed on the port and starboard side of the boat about midship.

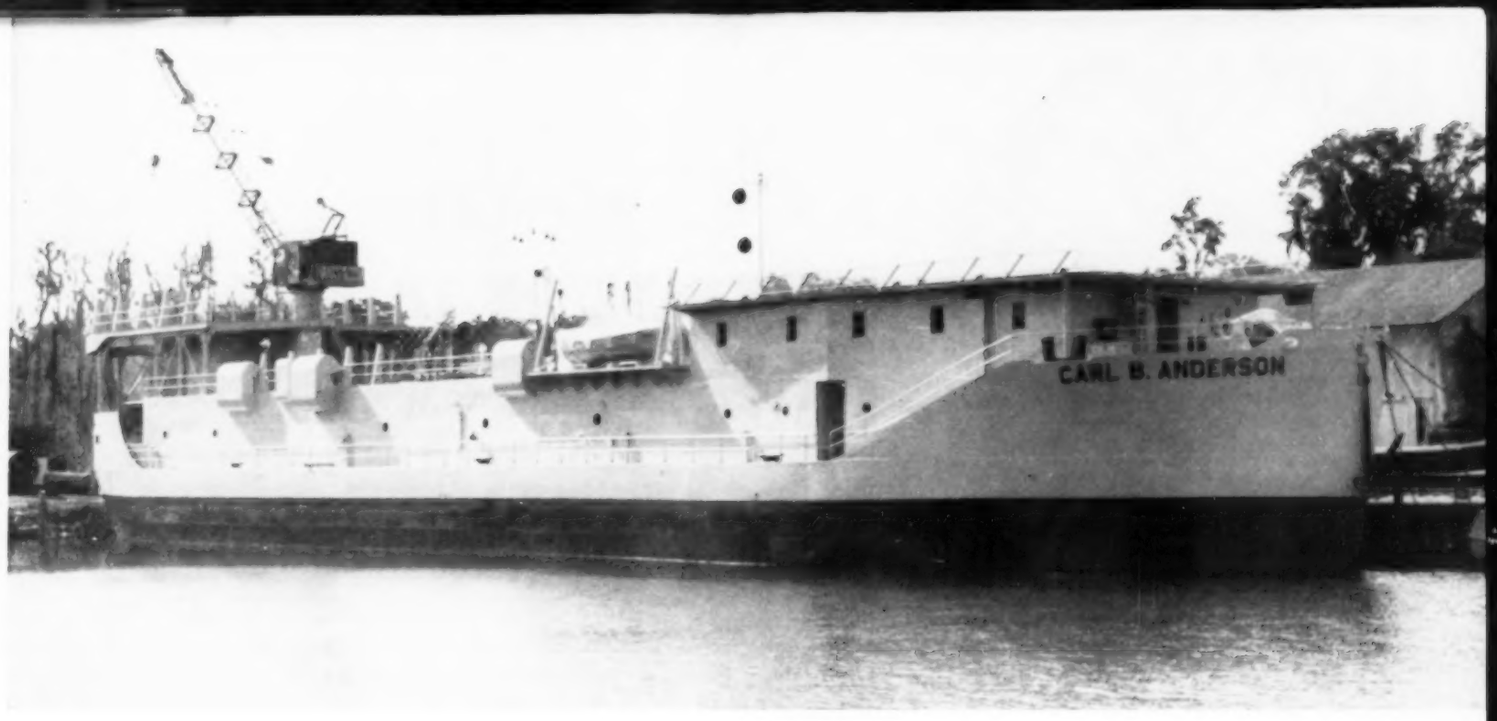
The deck house of the *H. B. Jordan* is of steel with Truscon steel doors and Kearfott aluminum windows. The forward pilot house windows were built by Kearfott. The interior walls and ceilings of the deck house and pilot house are covered with 2 in. fiber glass insulation. Steel lining for the interior house and partitions was furnished by Ward Industries. The engine room ceiling and walls down to the main deck level are sound proofed with insulation and acoustic blanket covered with Johns-Manville perforated transite. All inside floors are covered with J-M Terraflex except bathroom floors are of ceramic tile and shower stalls have non-skid cement floors.

The Crane heating boiler with convectors and unit heaters will maintain inside temperature at 70° when outside temperature is zero. For the summer comfort of the crew a Trane 5 ton air conditioning unit is ducted to all the quarters including the crews lounge on the main deck. The galley has a Magic Chef gas range, a 54 cu ft refrigerator, an 8.2 cu ft night box and a 15 cu ft deep freeze. Sink tops and work surfaces are all of stainless steel. The water piping on the boat for wash and drinking meet all the requirements of the U. S. Public Health Service and the boat is so certificated.

The pilot house is large with excellent vision ahead and astern. All the latest aids to navigation are conveniently located near the console. Hose McCann sound powered telephones connect the pilot house with the other vital parts of the boat. There is also a radio for ship to shore conversation and Decca radar to aid the pilot during foul weather. St. Louis Ship is proud of the *H. B. Jordan*. It represents another in a long list of "firsts" for this old established and largest builder of inland towboats. United States Steel can well be proud of pioneering the first stainless steel towboats which unquestionably will be followed by many others.

Hindmarch-DeLaval reverse reduction gear.





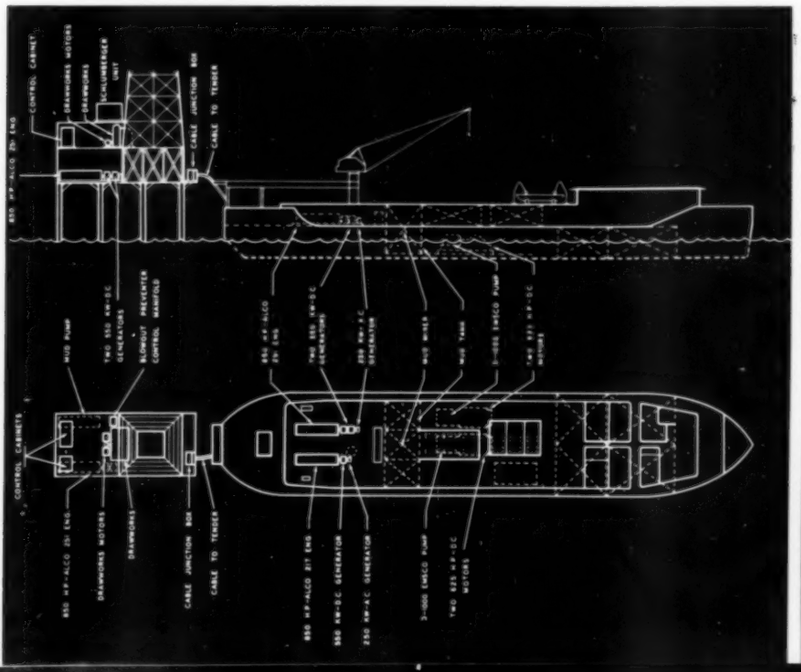
NEW TENDER FOR AN-SON GULF DRILLING CO.

DIESEL-electric power designed and manufactured by Alco Products, Inc. which will permit deep drilling from a platform only 60 by 90 ft has been installed on equipment owned by the An-Son Gulf Drilling Company at the Equitable Shipyard in New Orleans. The advantages of the hookup, wherein the primary power—consisting of two Alco 251 power packages—is aft of a drilling tender, are many and important. First, the smaller platform permits a rig set-up which minimizes the number of lifts required. This will result in considerable savings. Secondly, the arrangement is such that the tender can be pulled away from the platform leaving enough power on the platform so that pipe can be pulled and lighter duties performed.

In the event of an impending hurricane, for example, the tender can be abruptly towed away so as to reach a sheltered area in safety, while crewmen remain on the platform with sufficient power available to secure the drillsite. Personnel then can be transferred to safety by fast crewboat or helicopter. The hook-up, by virtue of the different combinations of power available for specific jobs, also will mean savings through reduction of fuel costs. Another advantage is compactness which results in more space on tender and platform for storage and other uses.

Power equipment on the tender consists of two Alco 251 engines rated at 850 hp each, three 550 kw dc generators, two 250 kw ac generators and four 625 hp dc motors. On the platform are the drawworks motors, main and auxiliary control cabinets, one Alco 251 engine and two 550 kw dc generators. The two mud pumps are D-1000 Models supplied by Emsco Mfg. Company.

The An-Son Gulf tender is 250 ft long with a 50-ft beam and a moulded depth of 15 ft, 8 in. The tender is held in place on location with four lines aft and four lines forward. Anchoring is controlled by chain winches, with lines attached to "dead man" anchor piles driven into the Gulf Floor. 6000-pound anchors and allied fair leads and chain stoppers are incorporated in the anchoring gear. Two decks contain living quarters. There are sleeping facilities for 44 men, only four men being assigned to one room. Lower deck contains galley, dining room, showers and sleeping quarters. Upper deck provides additional sleeping quarters, recreation room, offices and quarters for engineers and geologists. Living areas are air conditioned. Top deck has a heliport and the latest in communications equipment is being installed. In the middle deck forward to the platform end are a bulk mud storage bin for 3,500 sacks of mud and a three compartment bin for storage of cement. Third deck has storage tanks for about 13,000 barrels of drilling water and 24,000 gallons of diesel fuel.



One of two diesel generating sets on *Anderson*. This unit consists of an Alco model 251, 6-cylinder diesel engine developing 850 bhp; two 550 kw 600-volt General Electric dc generators; 2 2250-kw three-phase, 60 cycle 220-volt ac generator with exciter and one 50 kw dc 125-volt auxiliary generator.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now specializing in industrial advertising with Roles & Parker, Ltd. in London.

New Instruments For Testing Injection Equipment

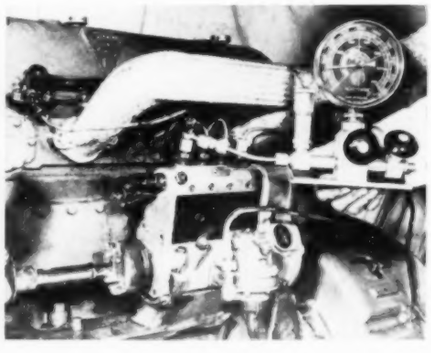
A NEW range of test equipment is now being produced and marketed by Dunedin Engineering Company Limited, Beauchamp Place, London, S.W.3. The range at present comprises an Injectometer for testing diesel injectors in-site on the engine; a Diestester for checking the compression in medium and high speed diesel engines at normal running speed, and an Injectester for testing both diesel injectors and diesel fuel pumps. The latter unit is of particular interest because it enables the injectors and the pump to be tested on site without removing the injectors or any part of the engine.

The Injectester has been designed to provide a means of carrying out all the usual tests under actual working conditions with the engine running. Among the advantages claimed to arise from its use are that the injector is set to the actual element with which it must work, the correct volume of fuel is being metered and the governor is in action. The injector, moreover, is set using normal fuel at actual working temperature. As a further test, using the Injectester, the injectors can be removed and tested for atomization, dry face and back leak.

The Injectester consists of a central block surmounted by a gauge, with a relief valve and 14 mm. connection on the left and a stop valve and 14 mm. connection on the right, although 12 & 14 mm. connections are available in Injectester Set. Other sizes are available if required. The gauge is graduated over a scale of 0-10,000 lb per sq in. and, in equivalent atmospheres. A white indicator records pressures and a red re-set pointer, controlled by a hand control on the perspex front, can be used as a guide for setting injectors to makers' recommended pressures and in testing pumps.

In the central block below the gauge is located a special control valve which controls the impulses of the pump and yet records top pressures steadily. It is so sensitive that the actual displacement caused by the operation of the delivery valve is shown and it will record immediately any drop in pressure when the engine is stopped. The control knob below the gauge is for bleeding the system and for releasing the pressure to return the white indicator to zero. To the left of the central block is situated a spring-loaded relief valve which is connected to the main block at one side and on the other has a 14 mm. connector joining it through suitable pipes to the tee piece when testing injectors or to the fuel pump. The relief valve is

The Injectester in use testing an injector under actual working conditions. If necessary, the injector can be removed and attached to the union on the right of the Injectester and checked for atomization.



set at 4,000, 6,000 or 8,000 lb per sq in., or twice the cracking pressure of the injector, and discharges excess fuel when testing the fuel pump or acts as a relief valve if the injector is completely blocked. A stop valve situated on the right of the central block is connected on one side to the central block and on the other has a 14 mm. connector to which a short pipe can be attached for the testing of faulty injectors. The valve is then opened and the injector tested for spray, pattern and dribble, after which the breaking pressure can be adjusted.

It will be appreciated that the Injectester, while giving a complete check on the injectors, delivery valve seats and pump elements, is not designed to check calibration or phasing of the fuel pump.

When testing injectors in the Injectester, dribble or back leak is shown by a low breaking pressure, partially blocked nozzles by high breaking pressure and, when the injector needle is sticking slightly under working temperature, a slow fluctuation of the white indicator is noted, i.e. a build up of between 10 and 20 atmospheres followed by a return to normal breaking pressure. If the delivery valve is losing pressure this will be indicated by rapid vibrations of the white indicator. Should this occur it will also be found that there is a rapid drop of the white indicator when the engine is stopped. A further check can be carried out by testing the delivery valve and element separately.

A guide to over-calibration of a fuel pump is obtained by giving full rack when testing injectors. If the delivery line pressure remains high after the initial surge takes place, it indicates that the pump should be removed for a calibration test.

To test and balance injectors, the calibration point of the pump must first be found and simple directions for doing this are included in the working instructions with each Injectester. The test for injectors is carried out by the insertion of a tee-piece in the delivery line, suitable pipes being provided in the kit for connecting the tee-piece to the left hand side of the Injectester. The engine is then started, bleeding is carried out by the valve provided, after which the white indicator will show the breaking pressure of the injector. Should the injector prove faulty it can then be removed studied and re-set as already described.

The Injectester is also useful for matching injectors to a reconditioned fuel pump, after calibration and phasing of the pump has been carried out. By using the instrument, it is possible for the pump to be issued with a matched set of injectors. Sets of tee-pieces and stop valves can be supplied for fitting to engines on test beds so that readings of injectors can be taken and the injectors corrected at regular intervals during running in. In this way the bedding of the injectors is corrected by the end of the test run and the engine goes into service with balanced injectors.

THE M/V *LADY ROSE-MARY*
EVERY INCH A LADY

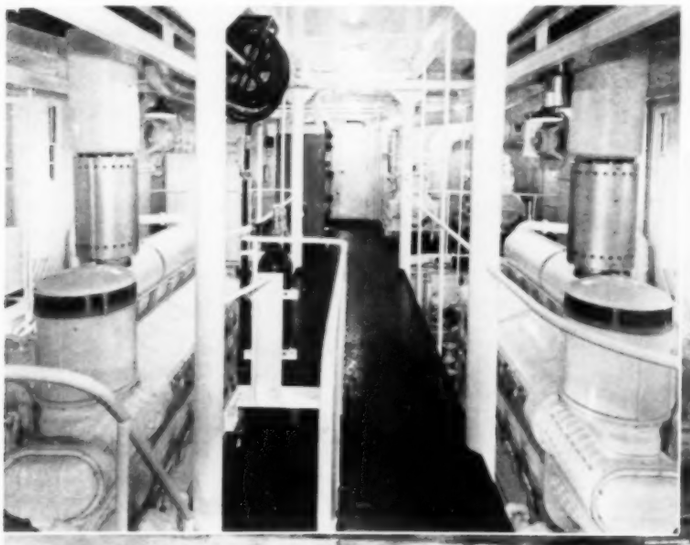
THE *Lady Rose-Mary*, latest addition to the fleet of the Inland Oil and Transport Company, St. Louis, Missouri, and the latest vessel off the Cumberland River ways of Nashville Bridge Company, Nashville, Tennessee, has been christened with this good name in tribute to the mothers of Mr. and Mrs. Sid Siteman. Mr. Siteman is President of Inland Oil and Transport Company. The *Lady Rose-Mary* joins the M/V *Lady Mignon*, which bears the name of Mrs Siteman, and the M/V *Lady Linda*, named for the Sitemans' daughter. She is every inch a lady and adds prestige to a good fleet. Of good basic materials and structure, of good lines and good performance, she moves with grace and unostentatious reserves of power, does her work with reliable efficiency, and makes her crew proud of her.

The "Lady" fleet is engaged in long-haul movement of gasoline and other petroleum products, primarily from Gulf Coast refineries and lower Mississippi River terminals to St. Louis and points on the Ohio River. These products are moved, in individual shipments ranging from a million and a half gallons to approximately three million gallons, for several large oil companies, including the St. Louis-based Marine Petroleum Company.

The M/V *Lady Rose-Mary* has molded hull dimensions of 130 ft x 30 ft x 10 ft 6 in. with the forward sheer of one foot. The smoothly formed spoon bow fairs into a rugged towboat head with two double towing knees of steel faced with oak. A generously rounded bilge radius and V-type bottom blends easily into the twin-tunneled stern section for easy flow of water to the screws. The entire hull is of a rugged design and was built to the highest classification of the American Bureau of Shipping for River Service. The *Lady Rose-Mary's* hull has eight (8) fuel oil tanks with a total capacity of 59,580 gallons, and two (2) lube oil tanks with a capacity of over 1,200 gallons. The hull also contains two (2) wash water tanks with a total capacity of 2,000 gallons, and two (2) potable water tanks with a total capacity of 3,500 gallons. Featured in the deck fitting arrangement are two (2) Nabrico 40-ton air operated winches and a 10 horsepower electric motor driven double barrel capstan.

Propulsion for this vessel is furnished by two (2) Cleveland Diesel Engine Division of GMC (model 12-567C) marine diesel engines each developing 1230 bhp at 800 rpm. These engines drive two (2) Avondale 90 in. diameter, 4 blade, stainless steel propellers through Falk reverse-reduction gears having a ratio of 3½:1 with airflex clutches. The steering system is composed of two (2) steering and two (2) flanking rudders which are actuated by a hydraulic ram system employing a full follow-up control. The steering and flanking rudder systems are independently operated.

The main and auxiliary engines cooling is accomplished by separate Nabrico internal heat exchangers built into the bottom plate of the hull. The electrical system receives it power from two (2) Detroit Diesel engine driven Delco generator sets that are equipped with electric starting units and are rated 60 kw, 225 volts, 3-phase, 60 cycle at 1200 rpm. Two water pressure systems are furnished—one for the potable water system and the other for the wash water. The hot water heating system is provided with a Crane oil fired boiler which provides hot water for the twelve (12) Yorkaire 1 hp air conditioners and heaters which accomplish the heating for all living quarters and to Trane convectors located in the baths, pilot house, and the engine room of the vessel. The fire and bilge system consists of a 15 hp Worthington and a 5 hp Ingersoll-Rand centrifugal pump each delivering 100 gpm. The fuel oil system consists of a Blackmer transfer pump which is capable of transferring oil from any oil bunker of the boat to any other bunker. It is also capable of transferring fuel from barges to the boat. There is also a Viking fuel oil service pump which takes fuel oil from the bunkers, passes through a Briggs filter and then to the day tank which supplies fuel oil to the heating boiler, generator sets, and the main engines. The lube oil system consists of two (2) lube oil tanks built into the hull which supplies lube oil to the Viking priming and transfer pumps for supplying oil to the main engines.



Upper engine room view of the *Lady Rose-Mary* showing the two Cleveland Diesel 12-cylinder model 567C, 2-cycle diesel engines, each rated 1200 shaft horsepower at 800 rpm. Engines are governed by Marquette governors and Briggs fuel oil filters keep the fuel clean.

GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

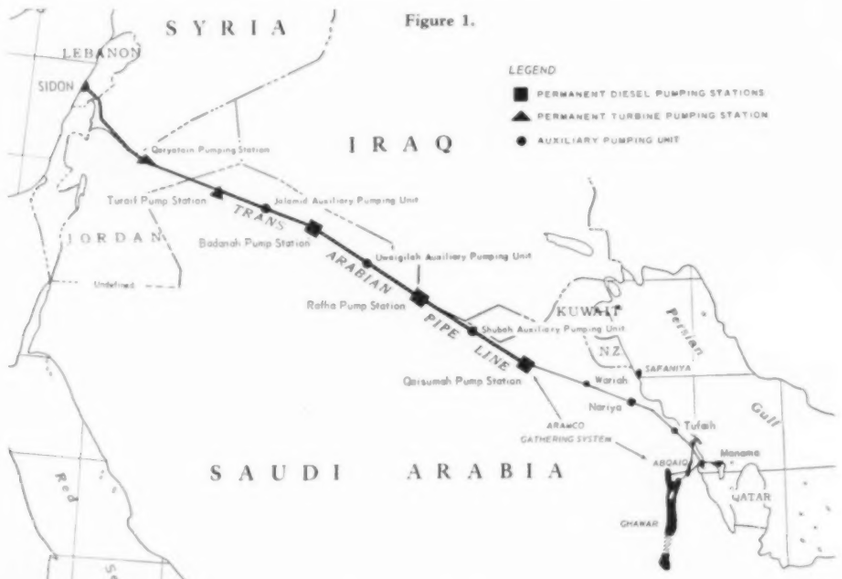
Gas Turbines On Trans-Arabian Pipeline

THE diesel and the gas turbine are now working together on tapline, (the Trans-Arabian Pipe Line) according to P. P. Nibley, Manager-Operations.* This pipe line extends from Qaisumah in Saudi Arabia to a tanker loading terminal on the Mediterranean near Sidon, Lebanon; a distance of 754 miles. The original four diesel pumping stations were completed in 1950 including Turaif. Each of these main stations has a community of 80 to 250 employees in the vast and barren Arabian Desert. See Fig. 1. The pipe line was initially constructed to accommodate additional pump stations at intermediate locations. However, the large investment and relatively high operating costs of attractive, self contained, complete community stations made this type of station economically unattractive for the intermediate sites. The most attractive scheme to increase capacity involved the installation of one 5,000 hp unattended gas turbine pumping unit at each of the 3 intermediate locations. These installations consist of only bare minimum facilities for pumping oil. This increased the entire system from 320,000 barrels per day to 450,000.

The International General Electric Company furnished the 9 gas turbines, each of the split shaft type rated 5000 hp at 110°F and 2600 ft altitude. Three are in permanent locations; one at Qaryatain, Jordan and two in one station at Turaif, Saudi Arabia. The former diesels at Turaif are now operating at the three remaining diesel stations shown on the map of Fig. 1. There are six portable unattended units, one in each of three stations located between the diesel pumping communities, two units on a 270 mile feeder line to the Persian Gulf, and one standby for these five operating units. The major work of installation was completed Jan. 1, 1958. The installed cost of an unattended auxiliary portable pumping unit complete is about $250 per bhp on the basis of an expected annual average output of 6,000 bhp.

The portable turbine units were not only built in Schenectady but completely prefabricated and factory tested in the United States. Each unit includes four vans, the turbine, control, radio and shop vans. The turbine is started by means of a 200 hp diesel engine with torque converter drive. The engine is coupled to the gas turbine through a jaw-type clutch which automatically disengages when the turbine reaches self-sustaining speed. The gas turbine burns crude oil taken from the pipe line. An Aqeous solution of a corrosion-reducing additive, magesium sulfate, is blended into the crude at the turbine. The crude oil contains about 10 ppm of vanadium and requires an addition of 0.03 per cent by weight of hydrous magnesium sulfate to minimize corrosion of the turbine blades. The additive system is contained within the turbine and control vans and is automatically coordinated with the fuel requirements. This is the first time that a main line oil pump has been driven directly at gas turbine speeds; the speed range of 5,000–6,000 rpm is considerably higher than that commonly used for oil pumps. This is the first time that a complete 5,000 hp pumping unit has been prefabricated and made wholly portable. Also, this is the first time that a gas turbine pumping unit has been operated unattended and by remote control. The pump was manufactured by Byron Jackson Pumps Inc., and is an extremely compact unit, with an over-all length of 5 ft, maximum width of 4 ft, maximum height of 4 ft, and weight of 4,650 lbs. The pump has the unique features of weighing less than 0.8 lbs per brake horsepower and delivering more than 600 psi differential with a single-stage impeller. The controls van also includes a large inlet air filter of the traveling screen type with oil bath reservoir and also an 800 ampere hour battery. The radio van also contains a 30 kw auxiliary diesel generator set which starts automatically when the gas turbine shuts down. The shop van also includes maintenance personnel facilities. The main machine shop facilities are at Turaif including a complete gas turbine test stand, dynamic balancer and other necessary equipment for major turbine overhauls.

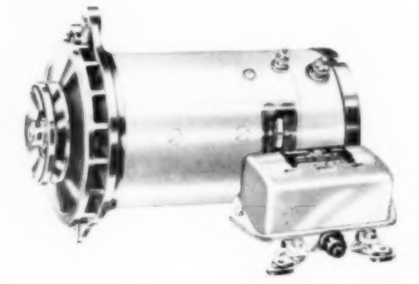
Figure 1.



The Trans-Arabian Pipe Line System

Messrs. P. P. Nibley of New York office and W. E. Locher and A. E. Olson at Beirut, Lebanon, all with Trans-Arabian Pipe Line Company wrote ASME paper 58-GTP-8 presented at the 3rd Annual Conference of the Gas Turbine Power Division in Washington, D.C., on March 3-6, 1958.

New Automotive Generator



Of special interest to operators of vehicles plagued by chronic battery trouble due to lack of charging current, is a new low cut-in generator announced by American Bosch Division, American Bosch Arma Corporation, Springfield, Massachusetts. The generator designated as the SSG and its companion regulator the SSR, are both heavy-duty units designed to withstand the rigors of severe service on police cars and other municipal or commercial vehicles such as taxicabs or trucks. Both units are easily distinguishable from previous models by being painted gray instead of the conventional black. The SSG Generator is said to embody all the refinements developed in the past plus additional new features. Armature windings are bonded to their slots by a powerful new heat resisting plastic and are further supported by fibre-glass bands to improve their ability to withstand high speeds. The slots between commutator segments are machined to high accuracy by a new electronically controlled process recently developed by American Bosch engineers. Field coils are encased in this special plastic and are no longer wrapped in tape. This provides greater protection against electrical or mechanical breakdown and permits better dissipation of heat. All parts are extra large, extra heavy and extra strong for long trouble-free life. Complete details are given in folder 130-185-7 which is available upon request. (ITS NEW)

Navy Mineplanter

A square-sterned, stubby-bowed vessel sailed from New Orleans on December 18, 1957, bound for Norfolk, Virginia. She was the U.S.S. YMP-3, nicknamed the *Wimpy* by the men who designed and built her at the Industrial Canal Plant of Higgins, Inc. The *Wimpy* is a harbor defense mineplanter, and as her numerical designator indicates, she is only the third of her kind ever built. An unusual ship, built for a highly specialized job, the YMP-3 was built under an unusual contract between Higgins, Inc., and the U.S. Navy. Under the terms of the contract, Higgins accomplished the design work, handled procurement of materials, and did the building and outfitting. The *Wimpy* underwent builder's tests and preliminary acceptance trials in waters near New Orleans. She met and passed all her tests with flying colors and was accepted by the Navy after the preliminary trials. She was sailed to Norfolk by a builder's crew, where she was officially turned over to the Navy.

The mineplanter's exacting job requires unusual maneuverability and precise control. There are three control stations on the bridge, in the center and on the port and starboard wings. Steering and engines may be controlled from any one of these stations, and control may be transferred from one station to another by a system of electric relays. The electrically powered steering and engine control system was designed and built by Higgins engineers. It is at present the only one of its kind. Particulars of the YMP-3 are as follows:

Length, Overall	129 ft-6 in.
Beam, Molded	35 ft-0 in.
Depth, Molded, Amidships	12 ft-6 in.
Draft, Load Waterline	9 ft-0 in.
Propulsion	(Twin Screw (2 White Superior Diesel (Engines 600 hp Each.
Speed	12 Knots
Fresh Water Capacity	10 Tons
Diesel Oil Capacity	18 Tons
Reduction Gear	Western Gear Sea Master Model 180
Diesel Generators	3 GM 6-71, 60 kw Each

Eaton Valves are Solving Problems Like These—

1
Broken valve due to overstressing.

2
Corrosion and cracking of the valve face caused by leakage.

3
Corrosion of the valve face due to sticking caused by stem and guide deposits.

4
Actual melting of valve material due to extremely high temperatures caused by preignition.

If you are having valve troubles, why not discuss them with Eaton Valve Division engineers. They will be glad to work with you in diagnosing the causes of failure, and in developing valves to meet the particular requirements of your engines and the kind of operation in which they are used. In hundreds of cases, Eaton engineers have been successful in suggesting measures which have corrected the most stubborn valve train problems. A study of your problem with complete technical report involves no obligation. Write, wire, or phone.

SODIUM-COOLED VALVES
•
SUPER-ALLOY VALVES
•
FREE-VALVES
•
FLEXIBLE VALVES
•
ALUMINIZED-HEAD VALVES

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EATON VALVE DIVISION
MANUFACTURING COMPANY
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Gulf Coast Diesel Notes

By Michael T. Pate

LONE STAR Steel Company, Inc., Lone Star, Texas, has bought from Cummins Sales & Service, Inc., Fort Worth, Texas, a model NHRIS Cummins diesel rated at 320 hp. The diesel is equipped with a model 17CK Clark Torcon torque converter and will power a model 54-B Bucyrus Erie shovel.

SHARP Drilling Company, Kermit, Texas, has bought a model VLRDBSU Waukesha diesel, rated 1101 hp at 1100 rpm, which it will use to drive a mud pump on one of the company's drilling rigs. The diesel was sold by Waukesha Sales & Service, Inc., of Houston.

LOUIS WALET, Loreauville, Louisiana, has bought from Cummins Sales & Service, Inc., Fort Worth, Texas, a model NHRMS Cummins diesel which will power a 34 ft boat through a model HYC EC 6900 Capitol hydraulic gear. Speed of boat is 25 mph.

HOWCO, Wichita Falls, Texas, has secured from Cummins Sales & Service, Inc., Fort Worth, Texas, two 600 hp model VT-12-BI Cummins diesels, which they will use to drive HOWCO model H-T-400 pumps.

HOUSTON Oil Field Material Company, Houston, Texas, has obtained a model 195DLCU Waukesha diesel, rated at 76 hp, from Waukesha Sales & Service, Inc., of Houston. The diesel is intended for pump drive.

GULF OIL Corporation, Marine Department, Houston, Texas, has secured a model HRIP Cummins diesel, rated at 600 hp, to drive a Dean-Hill pump. The engine was sold by Cummins Sales & Service, Inc., Fort Worth, Texas.

MORGAN City Towing Company, Morgan City, Louisiana, has bought two model HRMS Cummins diesels from Cummins Sales & Service, Inc., Fort Worth, Texas. The engines will turn 3-blade 50x32 wheels at 1600 rpm in tugboat service.

HERRIN Transportation Company, Inc., Houston, Texas, is repowering a model 723 Diamond T truck with a model JT-6-B 175 hp Cummins diesel obtained through Cummins Sales & Service, Fort Worth, Texas.

MARINE Enterprise, Mobile, Alabama, has bought through Cummins Diesel Sales, Inc., Birmingham, Ala., two model VT-12-M Cummins diesels, each rated 575 hp, which will be used to power a tugboat.

M.P.T., Inc., Houston, Mississippi, is repowering a model DCO-205 IHC truck with a model JT-6-B, Cummins diesel rated at 175 hp. The diesel was sold by Cummins Diesel Sales Corporation, Memphis, Tennessee.

DELTA Motor Lines, Jackson, Mississippi, is repowering an IHC model DCO-405 truck with a model JT-6-B Cummins diesel, rated 175 hp which was furnished by Cummins Diesel Sales Corporation, Memphis, Tennessee.

CONTINENTAL-Emsco Company, Dallas, Texas, has bought through Stewart & Stevenson Services, Inc., of Houston, a General Motors series 71, 3-cylinder model 3031-C diesel, equipped with 1.75:1 speed reducer. The Company also took delivery of two Stewart & Stevenson model 3GD-53 50 kw ac generating sets, each powered by a General Motors series 71, 3-cylinder model 3030-C diesel.

CHICAGO Procurement Office, Corps of Engineers, U.S.A., has taken delivery from Stewart & Stevenson Services, Inc.,

Owner Walgreen charts course with Captain Dave Casassa. Equipped with automatic pilot and radar, "*Sis W*" cruises the Great Lakes summers, heads for Florida in the fall.

Cast off care with GM DIESELS

"Ten years' excellent performance with GM Diesels . . . I have peace of mind knowing they're safer and more dependable."

C. R. Walgreen, Jr., Chicago

Matched pair of 235-s.h.p. GM "6-71" Diesels with aluminum blocks and components (weighing 2270 pounds each) give this trim ship a cruising speed of 13 m.p.h.

C. R. Walgreen, Jr., chose General Motors Diesel power for his 1956 Burger "*Sis W*" because of the excellent performance of "Jimmy" Diesels in his former yacht.

Owners like Mr. Walgreen speak from experience when they tell you these two-cycle engines are smooth, safer and more dependable. They stand up under long use. And in the rare times when service is needed, it's never far away.

What's more, these Diesels are not bulky or heavy. They leave room for spacious accommodations. They fit into boats as small as 22 feet.

You leave troubles astern when you cast off with GM Diesels aboard. So give yourself the best Christmas present ever. See your nearest GM Diesel dealer.

The 64' 10" steel hull "*Sis W*" was built by Burger Boat Company, Manitowoc, Wisc. She flies the burgee of the Chicago Yacht Club.

TV? Certainly. Mr. and Mrs. Walgreen relax in spacious, attractively appointed saloon. GM Diesels are quiet—and have no spark plugs to interfere with reception.

DETROIT DIESEL

Engine Division of General Motors
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GM DETROIT DIESEL POWER

Single Engines . . . 30 to 300 H.P.

Multiple Units . . . Up to 893 H.P.

Parts and Service Worldwide

Houston, Texas, of 15 special 45 kw 400 cycle ac generating sets, each driven by a General Motors series 71, 4-cylinder model 4030-C diesel.

EQUITABLE Equipment Company, New Orleans, Louisiana, has bought from Stewart & Stevenson Services, Inc., Houston, two series 71, model 6071-A 6-cylinder General Motors diesels, each equipped with $4\frac{1}{2}$:1 hydraulic R & R gear. The diesels are rated at 200 hp each.

DON BRASHEAR, Harlingen, Texas, will light and power his carnival with a Stewart & Stevenson model 6GD-66 60 kw ac generating set, powered by a series 71, model 6030-C 6-cylinder General Motors diesel.

IDECO Division, Dresser Industries, Inc., Dallas, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, a model 3GD-35 oilfield utility unit, consisting of a General Motors diesel, series 71, model 3030-C diesel, driving a 30 kw generator, an air compressor and a washdown pump, all unitized on a single base.

SOCONY-Mobil Oil Company, New York City, has bought through Stewart & Stevenson Services, Inc., Houston, a series 71, model 4082, 4-cylinder General Motors diesel, rated at 110 hp and connected to a torque converter.

DEL MASTRO Associates, Allwood, New Jersey, has taken delivery from Stewart & Stevenson Services, Inc., Houston, of four model RD-20 rig-lighting generator sets, consisting of a 20 kw ac generator, powered by a series 71, 2-cylinder, model 2030-C General Motors diesel.

STANDARD-Vacuum Oil Company, New York City, has bought from Stewart & Stevenson Services, Inc., Houston, a 3-cylinder, series 71, model 3030-C General Motors diesel which will be used to drive a centrifugal pump.

OILWELL Supply Company Division of U. S. Steel Co., has bought from Stewart & Stevenson Services, Inc., of Houston, a model 20-DA oilfield utility unit, unitized on a single base, with a 2-cylinder series 71, model 2030-C General Motors diesel powering a 20 kw ac generator, a washdown pump and an air compressor.

Booklet Evaluates Operating Costs

A guide to determine ownership and operating costs of various engines has been prepared by Cummins Engine Company, Inc., Columbus, Indiana. The Company has published a 26-page booklet entitled *Evaluating Diesel Power for Motor Trucks*. It enables truck operators to calculate the savings possible by using diesel instead of gasoline power and it helps determine the diesel engine they can most profitably use in a specific application. Figures presented in the publication give an accurate comparison of gasoline and diesel costs and show that "very substantial savings in overall truck operation and ownership costs represent the principal reasons why diesel truck sales are rising so rapidly." The booklet also tells: (1) How driver techniques, speeds and terrain affect fuel economy. (2) How to match the engine to specific horsepower requirements. (3) How higher average roadspeeds are possible with diesels. (4) How road failures can be reduced. (5) How gasoline and diesel maintenance costs compare. (6) The maximum weight and length laws for each state and province. A copy of *Evaluating Diesel Power for Motor Trucks* may be obtained from Cummins Distributors throughout the U. S. and Canada. The address of your nearest Cummins Distributor is available by writing Cummins Engine Company, Columbus, Indiana.

AAF Type W Cycoils assure clean air to gas compressors at this field processing plant of the Odessa Gasoline Company in Ector County, Texas.

AAF Cycoils protect compressor equipment day-in-day-out—require little maintenance

Why are AAF Cycoil oil bath air cleaners used for so many unmanned pumping stations and automatic plants? The reason is simple: Cycoils are known and *trusted* for dependability and efficiency. What's more, they require only infrequent maintenance because filter pads are self cleaning. Periodic replacement of oil is all that's required.

Cycoils' method of intermixing oil and dust-laden air traps 90% of the fine dust particles before they ever reach the final filter pads. That's why Cycoil-cleaned air is virtually 100% dust-free!

Whether it's a pulsating action or smooth flow application, involving packaged or stationary compressors, there's a Cycoil of a type and capacity to meet your needs. Write today for bulletins describing the complete line of Cycoil oil bath air cleaners.

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Oil and Gas Power Conference Program

The following is the tentative program for papers to be given at the 30th Annual Oil and Gas Power Division of the ASME Conference and Exhibit at the Bellevue Stratford Hotel, Philadelphia, Pa. to be held from May 12 through May 15, 1958.

Monday, May 12—Morning session: *Arctic Lubrication of Diesel Engines* by Earl J. Beck, Jr., U.S.N. Civil Engineering Laboratory, Port Hueneme, Calif. *Development of A Turbocharged Uniflow Two-Cycle Spark Ignition Gas Engine* by W. M. Kauffmann, Chief Engineer, Engine Division, Worthington Corporation. *Development of a Lightweight High Output Four Cycle Diesel Engine For Naval Service* by H. Holler, Nordberg Manufacturing Company, and L. Wechsler, Bureau of Ships, U.S.N., Washington.

Monday, May 12—afternoon session: *The Bureau of Ship's Part In the Development Of A Diesel Engine for the United States Navy* by J. H. Reinertson, Bureau of Ships, U.S.N., Washington, D.C. *The U.S. Naval Engineering Experiment Station's Part In the Development Of A Diesel Engine For the U.S. Navy* by Albert C. Cavileer, U.S.N.E.E.S., Annapolis, Md. *The Contractor's Part In the Development Of A Diesel Engine for The U.S. Navy* by Anker K. Antonsen, Fairbanks-Morse & Co.

Tuseday, May 13—morning session: *Lubrication of Large Diesel Cylinders* by J. E. Cox and P. D. Hobson, Shell Oil Co. *A New Look at Diesel Lubrication* by J. V. Kalb and S. M. Pier, the Texas Company. *Performance of Economy Diesel Fuels in a Railroad Locomotive Type Diesel Engine* by T. A. Kramer and D. P. Osterhout, Jr., the Socony Mobil Oil Company.

Tuesday, May 13—afternoon session: Panel discussion on *Maintenance Of Fuel Injection Systems.*

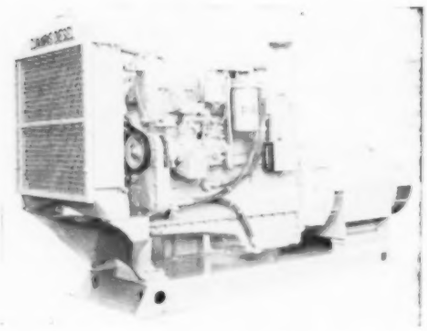
Wednesday, May 14—morning session: Panel discussion on *Maintenance Of Turbocharging Equipment.*

Thursday, May 15—morning session: *A Method of Charge Stratification For Spark Ignition Engines* by L. E. Conta and P. Durbetaki, University of Rochester, Rochester, N.Y. *Scientific Design Of A Diesel Governor* by A. G. Massey, Marquette-Massey Division, Curtiss Wright Corp. and R. Oldenburger, Purdue University, Lafayette, Indiana. *The Filtration of Diesel Engine Oils* by John R. McCoy, Mgr. Technical Service, Indiana Commercial Filters Corp.

Thursday, May 15—afternoon session: *The Free-Piston Engine Possibilities* by A. F. Moiroux, S.I.G.M.A., Paris, France. *The Buchi Telescope Valve System of Four Cycle Diesel Engines* by Dr. Alfred J. Buchi, Winterthur, Switzerland.

This full program promises many papers of importance to those interested in the design, operation and maintenance of diesel engines. Plan now to attend this vital conference.

Automatic Generator Set



A Cummins diesel driven fully-automatic electric power plant has been installed at the Blackstone office of the Ohio Bell Telephone Company, Akron, Ohio. The generator set is powered by a Model H-6 Cummins diesel which is rated 93 hp at 1200 rpm for continuous duty operation. The set is to be used by Ohio Bell for auxiliary service in cases of power failure. The diesel plant has a 50 kw capacity, 60 cycle, 3 phase, 4 wire, 120/208-139/240 volt rating and is capable of carrying the full load continuously and a 10 per cent overload for two hours. The set includes a switchboard on which meters, control equipment, and automatic transfer switch are mounted. It is equipped with a hydraulic type isochronous governor capable of regulating the frequency output of the alternator within $\pm 1/2$ of 1% of rated frequency (60 cycles) under all conditions of load. The set is arranged to start automatically within seconds on a reduction in commercial power service voltage to 85 per cent or less of normal on any phase. The alternator is

The World's Leading Manufacturers of

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for Diesel Engines

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Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California

Canadian Distributors:
Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Que.

AP-374-819

of 50 kw capacity, 1200 rpm, 0.8 power factor, 3 phase, 4 wire, 60 cycle with direct connected exciter. Sales of the diesel was handled by Cummins Diesel of Northern Ohio, Inc., Cleveland.

Special Service Tools

Bacharach Industrial Instrument Company has expanded its line of service tools for General Motors diesels to include items for testing and servicing GM 71T engines and the Series 71T injectors used in these engines. More than 250 items are offered,

the majority of which are also suitable for servicing GM 71 engines and other GM Diesels. Injector tester illustrated handles all GM Series 71 and 71T injectors, and can be adapted for testing GM 6-110 and 4, 6-51 injectors. For complete particulars send for Catalog 52. Bacharach Industrial Instrument Company, 200 N. Braddock Avenue, Pittsburgh 8, Pa. (ITS NEW)

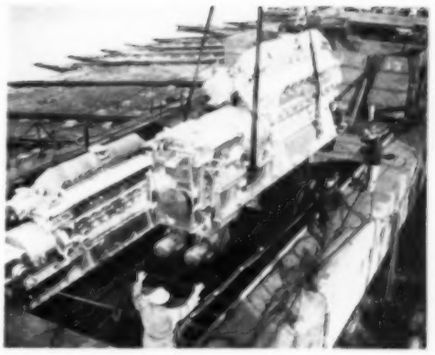
Appointed Sales Manager

John R. O'Donnell

John R. O'Donnell has been appointed Specialty Sales Manager of the American Bosch Division of American Bosch Arma Corporation according to an announcement by Bertram Cole, General Sales Manager. Mr. O'Donnell joined the Cleveland Regional Sales Office of American Bosch in 1953 and subsequently became Manager of that office. He is a graduate of the University of Detroit with the Degree of Bachelor of Mechanical Engineering, is a member of the Society of Automotive Engineers and the American Society of Mechanical Engineers. Thomas J. Kiely, a veteran American Bosch Field Engineer previously attached to the Chicago Regional Office, has been appointed to succeed Mr. O'Donnell as Manager of the Cleveland Regional Office. In his new capacity, Mr. O'Donnell will have full responsibility for the sale and promotion of the Hydrotor hydraulic cranking system recently acquired by American Bosch and which is expected to contribute substantially to the local Division's business in the future.

Towboat Purchased

One of two 3200 hp towboats being built for stock by Dravo Corporation, Pittsburgh, has been purchased by Sioux City & New Orleans Barge Lines, Inc., of Houston, Texas. By taking advantage of Dravo's unusual "3200" shipbuilding program, Sioux City & New Orleans Barge Lines will have the boat in service in approximately half the time normally required for design, engineering and construction of such vessels. The new towboat, which will be one of the fastest and most powerful of its type on the inland waterways, will be known as the *Crescent City*. She will be 148 ft long, 34 ft wide and 10½ ft deep, and will be powered by two General Motors 16 cylinder 567C marine diesel engines, each capable of delivering 1600 shp. Second Dravo–3200 towboat to enter service, the *Crescent City* will operate primarily on the Mississippi River between New Orleans and St. Louis.



GM 1600 hp diesels being lowered into the *Crescent City*.

This is the

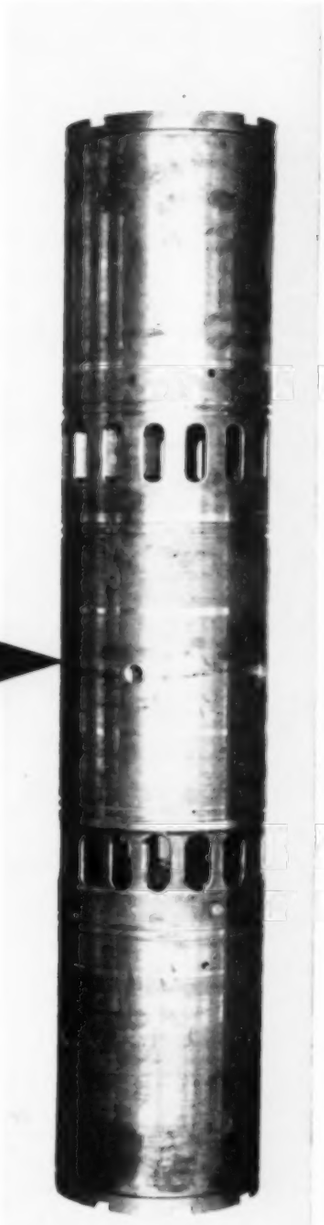
HEAVIEST DUTY LINER

ever successfully

CHROME PLATED

CHANNELCROMED

Baldwin-Lima-Hamilton 8¼ in. x 55½ in. free piston engine cylinder liner...



Supercharged at 200 inches of mercury pressure, firing pressure in this free piston engine liner goes to an unprecedently and extraordinarily high 2,500 to 2,800 pounds, at which no other chromium operated for more than about 700 hours, where Channelcromium in the same free piston liner has now been operating for about three years, with no sign of distress or failure as by scuffing, scoring or peeling, due to continuously PERFECT LUBRICATION OF CHANNELCROMIUM.

Write for Bulletin 76 on Diesel engine liners.

PENNINGTON CHANNELCROMIUM COMPANY

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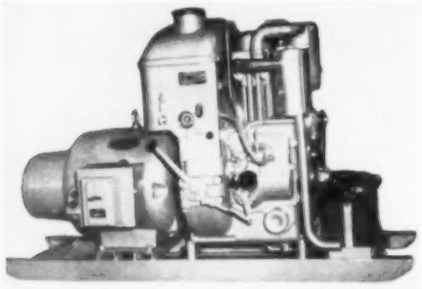
New Generator Set Line



An original equipment manufacturer has chosen Kato generators in the fabrication of a new line of electric power plants. The firm, Crossfield & Nicholson Company, uses the trade name *Diesel-ight* for their air-cooled diesel electric light and power units. Generator sets are available from 2 kw to 250 kw. All sets are powered by Deutz air-cooled diesel engines. Company headquarters are at 377 Dewey Avenue, St. Paul 4, Minnesota. The generator sets are designed for maximum dependability, economy and long life, for standby or continuous service. Kato generators are conservatively rated to facilitate starting single phase ac motors which require as much as five times current for starting. The plant illustrated features a 5 kw, three phase, 60 cycle Kato generator with direct connected dc exciter. The generator is direct connected to a Deutz air-cooled diesel engine with generator and engine mounted on a common welded steel base. ITS NEW

New Lightweight Diamond T Truck

Shown is one of ten new lightweight Diamond T diesels now being operated by a major Western carrier hauling general freight up and down the Pacific Coast. The tractors are 922FNT-SQW's. Development of the new lightweight 922 series by Diamond T entailed major engineering effort, for chassis weight was held to a minimum while ample strength was maintained. Result of the liberal use of aluminum and extensive use of specially fabricated lightweight parts is a truly light truck. Among the lightweight elements Diamond T has engineered into this new diesel series are a sturdy heat-treated alloy-steel frame, aluminum crossmembers, aluminum bumper, hood, battery box and other parts made entirely of this weight-saving metal. A Hopkins muffler with special lightweight supports, lightweight fuel tank supports and rod-actuated emergency brake save additional pounds of chassis weight. Options to trim weight still further include aluminum cases on the transmission and auxiliary transmission when used, aluminum hubs for many of Diamond T's optional axles, and either NAX or aluminum disc wheels. Tubeless tires, which are considerably lighter than conventional tube type, offer a further reduction in weight and are offered at no additional cost.

Chassis weights are influenced by a number of factors, of course, mainly by specifications and wheelbase. However, it is understood that a completely equipped 922 chassis, with all standard equipment including trailer connections, ranges in weight from approximately 10,300 lbs for single rear

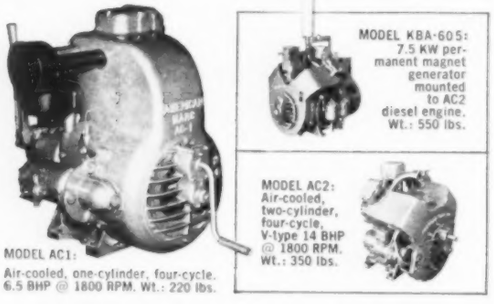
axle vehicles to around 12,500 lbs for six-wheelers. All weights include the 220 hp Cummins NH-6 diesel engine, and are for the complete truck chassis though less fuel and fifth wheel. Included in the specifications of the 922FNT-SQW illustrated are: Cummins NTO-6 turbo-supercharged diesel engine, 262 hp, Timken FE900 front axle, Fuller R96 Roadranger transmission, Timken SQW tandem rear axle, Spicer 11 in. two-plate clutch, Kysor automatic radiator shutters. ITS NEW

Oil Rig Tenders

Blount Marine Corp. of Warren, Rhode Island, the biggest shipyard in the smallest State, has again proved that it can deliver good and economical ships. Three oil rig tenders were delivered to George Engine Co. of Harvey, La. in 1957 and a fourth one to Fred Barefoot of Harvey, La. They are all named *Botruc* because of their resemblance to cab-over-engine trucks. It took 70 days to con-

LIGHTWEIGHT CHAMPIONS

by America's largest manufacturer of AIR-COOLED DIESELS


MODEL KBA-605: 7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.
MODEL AC2: Air-cooled, two-cylinder, four-cycle, V-type 14 BHP @ 1800 RPM. Wt.: 350 lbs.
MODEL AC1: Air-cooled, one-cylinder, four-cycle. 6.5 BHP @ 1800 RPM. Wt.: 220 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

AMERICAN MARC INC.
DIESEL ENGINES
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silencers and

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for every industrial, mobile and marine application

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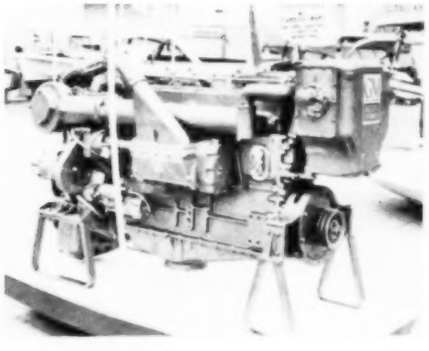
struct each *Botruc* and they were delivered to the owners by Blount Marine delivery crews via the Atlantic Coast, Okeechobee waterway and Gulf Coast. The main feature of these new vessels is their long, unobstructed after cargo deck which handles a pay load of 65 tons. The deck is 45 ft long, 22 ft wide and is enclosed by removable bulwarks for easy side and stern loading. The cargo deck has a center lane for carrying vehicles and is reinforced to carry a load of 700 lb per sq ft. The operating crew is two men but it can accommodate six men. Each *Botruc* has a beam of 23 ft, hull depth 7½ ft, draft light 4 ft 8 in. and freeboard

light 3½ ft. Deck side and bottom plates are $\frac{5}{16}$ in. steel. Frames are 3 by 5 in. angles, heavy longitudinals of 10 in. girders and bulkheads ¼ in. and well stiffened for use as deep tanks. Propulsion is supplied by two General Motors 6-110 diesels with 3:1 reduction gear and driving 42 in. propellers. Top speed is 13 knots.

New Marine Diesel



New to the GM Detroit Diesel Division's line of pleasure craft engines is this 364 hp unit displayed publicly for the first time at the National Motor Boat Show in New York. The unit is a six-cylinder Series 110 model to which a turbocharger has been added. This Turbo-powered unit with its improved combustion through better engine breathing effects a substantial 75 hp increase over the pleasure boat rating of the non-turbocharged unit. It adds a new high to the power range of GM Diesel's line of single engines for pleasure boat installations..

ITS NEW

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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. . . for Quick, Easy Fluid Line Assembly

For easy-to-assemble, trouble-free fluid lines, depend on Stratogrip reusable fittings and Stratoflex flexible hose. A wide range of sizes and types assures you of exactly the right hose and fittings for your low pressure fuel, oil, air or other fluid line requirements. Make up your own hose assemblies the quick, easy, dependable way . . . with Stratoflex flexible hose and Stratogrip fittings.

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Inland River Reports

By A. D. Burroughs

INLAND river weather and water levels made up the big news items, hitting the nation's headlines. The return of sunshine and warm temps meant far more than a spring preview. It ended the rivermen's fears of a 1936 repetition, and active river trade renewed. The Illinois River was frozen from the mouth to near Morris, Ill. The Missouri River was an ice-choked channel at St. Joseph, Mo., Sioux City, Iowa, and points above. Heavy floating ice was seen at Omaha, Neb., ice gorges at Waverly, Mo., and thick floes at St. Charles, Mo. The severest weather in two decades hit the Ohio River, with a 300-mile ice sheet stretching from Pittsburgh to Huntington. Water level at Evansville (Ind) reached below the 8.4, lowest since the dams were completed in 1926, and tows were temporarily stranded. Icy waters sent the majority of Mississippi-Ohio River towboats scurrying to the deep warm waters of the Green River. More than 300 barges were moored in the Green at one time, and the diesel lineup looked like Who's Who on Inland Rivers, with numerous diesel vessels hugging the Green's banks.

AT CAIRO, Ill., we watched Federal Barge Line's powerful *Lachlan MacLeay* put the 3600 hp developed from four GM engines to chop the channel for several trapped towboats.

DIESEL towboat construction continued, and two General Motors engines will provide the 2400 hp for the Wheeling Steel Corp. towboat currently under construction at St. Louis Shipbuilding & Steel Corp. The 145 x 31 ft craft is slated to be the most powerful in the Wheeling fleet.

ST. LOUIS Shipbuilding & Steel Corp. marked up the completion of its 157th towboat as the 120 x 27 ft *S. M. Jenks* went into the coal trade for owners U. S. Steel Corp. DeLaval-Hindmarch reverse-reduction gears, Westinghouse Air Brakes, and two Fairbanks-Morse OP engines, rated at 640 hp at 720 rpm are on the equipment listing.

AN IMPRESSIVE equipment list mounts the new *Western Star*, in the log trade on the Columbia River for Western Transportation Co. Equipment includes Quincy air compressor, Bendix fuel injection equipment, Cuno lube oil pressure strainer, Winslow fuel oil filter, Hilco HEC-8FF lube oil filter. Main propulsion power comes from an Enterprise DMG-38 diesel.

THE TVA at Chattanooga, Tenn., called for bids to furnish, sell, and deliver a harbor tug scheduled to measure 36 x 16 ft. Plans call for the name, *Cecile H.*, and two main engines, Cummins HRM-600, or a pair of GM 71-6045C's.

SOUTH American diesels get another increase with the 920-gross-ton towboat, *Urucum 1*, delivered by St. Louis Shipbuilding and Steel Corp. to the Campanhia Merdional De Mineracao. GM 16 cylinder 567C engines provide the rated 3200 hp.

A PAIR of Waukesha super-charged Model 6LRBMS diesels, delivering 540 hp each at 1200 rpm make up the main propulsion power for the rebuilt and renamed *Beryl*. Owned by Cumberland River Sand and Gravel Co., Nashville, Tenn., the craft was formerly known as the *Dorothy*.

THANKS to Walt Gennette, Taylor Machinery Co., Memphis, Tenn., for sending the news of the sale of two new Caterpillar D397 turbocharged engines, 500 hp each, for installation on the towboat, *Lucinda Clark*, owned by McAllister-Davis Co. He adds that the engines are equipped with Snow-Nabstedt gears.

ON THE waters, the Ohio River Company racked up a good score of coal tows before the freeze as *Queen City*, *City of Huntington*, *Mike Creditor* and the *Bob Benter*, all powered with Baldwin-Lima-Hamilton engines, were spotted in the renewed pickup of the coal traffic.

COMMENTS were enthusiastic on the speed and power shown by the new *J. B. Chauvin*, of the Chotin fleet, when we saw it on the Upper Ohio making splendid speed with power from the Fairbanks-Morse engines, rated at 600 hp each.

AT BAYOU Labatre, Ala., Bryant Boats, Inc., was putting the finishing touches on a new and unique aluminum tug. Reportedly the first all-welded, all-aluminum tug ever built, the 55 by 17 ft tug will have power supplied by twin GM 6-110's, installed on laminated plastic pads. This hawser tug is built in cooperation with Kaiser Aluminum and the Kennedy Marine Engine Company, Biloxi, Miss.

AND IN our photo library goes the newest pix, the towboat *Cindy Jo*, owned by the Rose Barge Line, powered with a pair of Superior Turbocharged engines, equipped with two Western Gear Sea Master 3:1 Model 210 MGV 160 reduction gears.

AND AS always, neither ice, sleet, nor snow keeps river and diesel folks from gathering at the annual meetin's, with proof in the 1,000 marine towing and transportation industry leaders attending the 22nd annual banquet of the Harbor Carriers of the Port of New York, as well as the largest turnout in the association's history at the Mississippi Valley Association meeting in St. Louis.

Harbormaster Catalog

A new 2-page Condensed Catalog shows installations and features of Harbormasters for solving tough marine power and steering problems. Details, including a comprehensive table of specifications on 17 Models from 40 to 500 hp are included. For a copy write Murray & Tregurtha, Inc., 80 Hancock Street, Quincy 71, Massachusetts.

NUGENT "Full-Flow" FILTERS in their 26th YEAR of service on Bush Terminal Locomotives

STERLING 8-1000
BUSH TERMINAL RAILROAD COMPANY
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BROOKLYN 32, N. Y.
December 13, 1957
William W. Nugent and Company, Inc.
3440 Cleveland Street
Skokie, Illinois
Attention: Mr. Corliss D. Nugent, President
Nº 5
BUSH TERMINAL
NUGENT OIL FILTER
It may be of interest to you and your Company that our seven Locomotives of this type have had continuous service since October 1932 and the majority of internal parts are still the original. I attribute this to your fine filter that is being used on these engines.
Yours very truly,
C. W. Jud
Master Mechanic
CWJ:ec

Mr. C.W. Jud, author of the statement above, is well qualified to judge the long term economy of Nugent *Full Flow* Filtering. Master mechanic for Bush Terminal Railroad Company, he was with that organization prior to 1932, when these seven Ingersoll-Rand diesel powered G.E. locomotives went into service. Mr. Jud reports that after more than 25 years of continuous service the majority of internal engine parts still require no replacement. This fact he attributes to the excellent performance of Nugent Lube Oil Filters, installed as original equipment on these engines.

If you have valuable equipment that demands dependable 'round-the-clock filtering protection with a minimum of maintenance, Nugent can help you. Send an outline of your requirements . . . we'll take it from there.

ESTABLISHED 1897

REPRESENTATIVES IN PRINCIPAL CITIES

WM. W. NUGENT & CO., INC.
3441 CLEVELAND STREET, SKOKIE, ILLINOIS
OIL FILTERS • STRAINERS • TELESCOPIC OILERS
OILING AND FILTERING SYSTEMS • OILING DEVICES
SIGHT FEED VALVES • FLOW INDICATORS

Mid-West Diesel News

By **L. H. Houck**

RIVER KING Mine of the Peabody Coal Co., Freeburg, Ill., has taken delivery on 10 Euclid 62 cu yd. trucks from Euclid Sales & Service, St. Louis. Power is 335 hp NRTO Cummins, turbocharged diesel.

FIFTY cab-forward Mack diesel trucks have been delivered to Specter-Midstates, Chicago, for routes in mid-west and east. Power is Mack Thermodyne diesels.

A MURPHY 21 industrial diesel has been delivered to Vigus Quarries, St. Louis, by Cummins, McGowand & West, Inc., St. Louis dealers.

NOOTER CORP., well known steel fabricators, St. Louis, purchased a 150 kw generator set from Cummins, McGowan & West, Inc. It is powered with a Murphy Model 124 diesel.

WHITE 9000 TD truck was repowered by Max R. Parsley, Indianapolis, with a 190 hp HRF-6-B Cummins diesel from the local Cummins dealer.

INTERSTATE Motor Lines, Inc., Denver, has repowered a Peterbuilt 351 COE with a Cummins NH-220 diesel from Cummins Diesel Sales Corp., Denver.

ELROD Equipment Co., 4517 Level Rod., Louisville, Ky., is a new dealer for the complete P & H line from the 10-ton Miti-mite through 2½ cu yd cranes and the P & H diesel engine.

MILLSTONE Construction Co., St. Louis, has put a new Gardner-Denver 365 cu ft air compressor in service on one of its expressway jobs. The compressor is powered with a 4-71 GMC diesel. Cummins, McGowan & West, Inc., were the dealers.

MASSMAN Construction Co., St. Louis, have taken delivery on a Northwest Model 6 shovel powered with a Murphy diesel Model 20, from Cummins, McGowan & West, Inc., St. Louis.

PUBLIC Service Co., of Indiana, installed two Cummins 160 hp H-6-B-I diesels for the GE unit at the Dresser Power Plant, West Terra Haute, Ind.

WHITE Freightliner, owned by Leonard Jansen, St. Paul, Minn., was repowered with a Cummins 262 hp NTO diesel from Cummins Diesel Sales, Inc., St. Paul.

O. B. AVERY & Co., delivered an Adams 550 motor grader to Millstone Construction Co., for use on their contract on the Daniel Boone Expressway. Engine was a Cummins diesel.

ECKRICH PAVING Co., Overland, Mo., near St. Louis, took delivery on an Adams 220 grader from O. B. Avery & Co., St. Louis dealers. Unit was powered with a 4-71 GMC diesel.

POTASHNIC Equipment Co., Cape Girardeau, Mo., took delivery of a Northwest 80-D shovel from Cummins, McGowan & West, Inc., St. Louis dealers. The 2½-cu yd unit was powered with a Murphy Model 21 diesel.

SILVER FLEET Express, Louisville, Ky., bought four 175 hp JT-6-B diesels for powering White 9000 tractors. Cummins Diesel Sales, Louisville, made the sale.

AN AUTOCAR DC10264L has been repowered with a 220 hp NH-6-B Cummins engine by owner, John Howard, South Bend, Ind. Sale was made by Cummins Diesel Sales Corp., Indianapolis.

SPRICK QUARRY, Warrenton, Mo., has purchased a Cummins diesel unit for use in its rock plant. Engine is 130 hp NHC-4-P.

LEASED TRUCK, Sioux City, Ia., has repowered a Diamond T 723C truck with a Cummins 175 hp JT-6-B from Cummins Mid-West at Omaha.

TWO Northwest Model 25 pull shovels have been placed in service by Al Fishell, St. Louis. Each is powered wih a Caterpillar D-318 diesel and sale was made by Cummins, McGowan & West, Inc.

Industrial Sales Department Formed

E. A. Henry, manager of OEM and government sales, has been appointed manager of the newly organized industrial sales department of Minneapolis-Moline, Matt Carroll, general sales manager, announced recently. Increasing sales of the firm's power units and engines, industrial wheeled and crawler tractors, and attachments for the construction and highway work, dictated formation of the new sales department.

In charge of three distinct sales functions within the department are: David S. Hansen, industrial dealer sales; George W. Balch, OEM sales; and Sidney R. Morrow, government sales. Travelling district representatives have been assigned to handle wholesale operations in different geographical areas: John P. Seibel, with headquarters at Harrisburg, Pa., travels New England, New York, eastern Pennsylvania, New Jersey, Maryland, and Delaware; Thomas G. Gaffka, Columbus, Ohio, serves western Pennsylvania, Ohio, Indiana, Michigan, and Kentucky; and Harold Bradshaw, Minneapolis, Minn., serves Illinois, Wisconsin, Missouri, Nebraska, Iowa, Minnesota, South Dakota and North Dakota.

These district representatives report directly to Henry at the home office. In the other states, the firm's branch offices will handle industrial sales under the general supervision of the home office, with immediate responsibility to the branch manager. The firm is increasing the number of models of its utility and industrial wheeled tractors, engines, and power units. Additional diesel models of power units and tractors are also in production.

PERFORMANCE

Satin smooth

more RUGGED than a boom boat

Here is the perfect mate for the modern marine diesel . . . with every desirable feature to provide satin smooth power with utmost reliability. The S-N 3900 Series Hydraulic Gears, with responsive finger-tip control, transmit full load and speed either ahead or astern with no loss of power due to clutch drag. Simple compact design . . . extremely rugged construction . . . easiest to service . . . low price per horsepower . . . and widest choice of reduction gear ratios are but a few of the reasons why more operators specify S-N 3900 Series for new installations or repowering. For complete information see your S-N distributor or write direct. The Snow-Nabstedt Gear Corporation, Hamden, Connecticut.

SNOW-NABSTEDT

Transmission Engineers FOR OVER HALF A CENTURY

Florida Diesel News

By Ed Dennis

THE *Caribbean Sea*, a 67 ft trawler, launched at Diesel Engine Sales of St. Augustine, was number 700 for this firm. The vessel hit the water just 363 days after the completion of the *Mary Call Collins* #600. Owned by Sahlman Seafoods of Fernandina, the trawler is powered with a D342 Caterpillar diesel which is rated 150 hp at 1225 rpm to give the new craft a speed of 12 knots.

AT POMPANO Beach, Hutchison Bros., a construction firm, is making good use of their new Galion Roll-o-matic road roller powered with a Continental HD260 four cycle diesel. This 4 cyl engine is rated 59 hp at 2000 rpm.

ELLIS Diesel Sales & Service of Fort Lauderdale repowered the 78 foot yacht *Ida B* with two General Motors 6-110 diesels each rated 286 hp. 1.5:1 GM hydraulic gears were also included to give the vessel a 20 knot speed.

THE LIVE Oak Stone Co. of Live Oak, Florida, received two 190 hp Cummins diesel engines from the Jacksonville branch of Cummins Diesel Engines of Florida. These model HRF6BI diesels will be used to repower two Euclid dump trucks.

THE Meekins Quarries, northwest of Fort Lauderdale, have for power in their new 3½ yard Lima dragline, a GM 6-110 diesel. Also included are a Woodward governor, Fulflo fuel oil filters, two Donaldson air filters and a Clark Torcon torque converter.

DIESEL Engine Sales, St. Augustine, just completed delivery of 12 of their 67 ft trawlers to Productos Refregerados of Cuidad del Carmen of Mexico. All are powered with D342 Caterpillar diesel engines rated 150 hp at 1225 rpm driving a 50 x 34 four blade Federal propeller through 3:1 Snow Nabstedt r&r gears.

FOR USE in their Port Charlotte land development project, the Mackle Co., took delivery of a 200 hp TD24 International diesel crawler tractor, two TD-18 tractors each rated 105 drawbar hp and a 78 hp TD14 crawler tractor all from Florida Georgia Tractor Co. of Miami.

THE WEST Indies freighter *Melinda* of Puerto Limon Costa Rica was repowered with two model D375 Caterpillar diesel engines to drive the 50 x 46 four bladed Ferguson propellers through 3:1 Snow-Nabstedt r&r gears for an increased speed of 3 knots.

THE MIAMI Shipbuilding Co. is constructing a 45 ft auxiliary vessel to be called the *Romany*. It will be powered with a 6 cyl model NHRMS-600 Cummins diesel and Capitol hydraulic r&r gears. The Onan diesel generating set is rated 3 kw.

SOUTHEAST Diesel Marine in Miami supplied the 330 cu in. 6 cyl model Y Ford marine diesel engines for the 42 ft twin screw sportsfisherman being built at Chris Boat Yards. These diesels are rated 100 shp, have Higgins 2:1 marine transmission gears and Simms fuel oil systems.

THE eleventh and last of the 172 ft wooden minesweepers built for the U.S. Navy by Broward Marine was commissioned recently. Powered with two 600 hp Packard diesel engines, the U.S.S. Venture, will join the other 21 ocean minesweepers in the Atlantic fleet.

AT CODEN, Alabama, the Lilly & Clark Co. had a model NHRSM-600 Cummins diesel, rated 300 hp at 2100 rpm, installed in their shrimp trawler.

FLORIDA Georgia Tractor Co. delivered to Meekins Quarries of Hollywood what are probably the largest off-the-hiway dump trucks in South Florida. The three 18 ton payload International Payhauler trucks are powered with NT6BI turbocharged 250 hp Cummins diesel engines plus a 10 speed constant-mesh transmission. They weigh 40,160 lbs empty.

A 150 KW Kato 3 phase 60 cycle generator set, powered by a General Motors 6-110 diesel engine, will be installed when the First National Bank of Miami's new home is completed. Electrical contractors are L. K. Comstock Company, Inc.

RECENT General Motors dieselized equipment received were a 6-030C (6-71) in a model 795-C American Crawler crane for Earth Moving Construction Company, and a ¾ yd Bucyrus Erie dragline with a GM 330C diesel and GM power take-off received by the Des Rocher Sand Co.

CAPELETTI Bros., Inc. road contractors of Hialeah received for their rock quarries an Eagle rock crusher powered with a Murphy diesel which has a hp rating of 117 at 1200 rpm. The diesel drives a 20 kw Columbian generator with Twin Disc power take-off and 10 V belts to supply electrical power for the electrical control and equipment. The unit is mounted on a pneumatic tired trailer.

TAMPA Marine built a twin screw 85 ft crew boat which will be used in the Lake Maracaibo oil fields. It is powered with General Motors 6-110's and GM hydraulic r&r gears plus a 3064B 30 kw Delco diesel generating set.

A MODEL 363 Mercedes-Benz 10 kw diesel generating set was installed on the Huckins built yacht *Susabelle B* by Allied Marine of Miami, Fla.

ROAD Rock Products of Fort Lauderdale received a GM 3030C (3-71) dieselized Reich dynamite drilling rig. Mounted on a 10 wheel White truck, the unit also contains a GM power take-off V belted to a Gardner-Denver vertical air compressor.

PUERTO Rican Lighterage Co. received their newly launched 70 ft tow boat from Dade Drydock Co. Powered with a D397 Caterpillar diesel, it has a hp rating of 650 at 1300 rpm along with 4:1 Snow Nabstedt r&r gears. It will be used on Coastal and harbor work around San Juan.

Diesels For Radar Station

Alco Products, Inc. recently completed shipment from its Auburn plant of six diesel-generator sets to provide operating power for an Air Force radar station. The skid-mounted power packages were supplied to the General Electric Company on an order valued in excess of $800,000. The location of the radar post they will power was not disclosed. Each of the power packages consists of a 16-cylinder Alco Model 251-B diesel engine and a 1300 kw General Electric ac generator. The vee-type Alco engines develop 1830 bhp in this application, and both the engine and generator will operate at 900 rpm.

New Distributor

Franchisement of Fluid Mechanics, Inc., 6723 Denison Avenue, Cleveland, Ohio,

now!

IMMEDIATE DELIVERY

ON MANY TYPES AND SIZES OF

MAXIM SILENCERS

Need silencers on short notice? Contact Maxim. We are now stocking an increasing number of the more widely used types and sizes. As a result, we may be able to give you immediate delivery.

If the type and size you need is not in stock, you can still depend upon Maxim to give you best delivery — from the *most complete line of industrial silencers*. Equally important, you can count upon outstanding performance — in the tradition that has made Maxim the preferred silencer throughout industry. Maxim, more than ever, stands for special customer service.

THE MAXIM SILENCER COMPANY

Subsidiary of Emhart Manufacturing Company

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as central distributors for the Hydrotor hydraulic starter has been announced by American Bosch Arma Corporation since their recent acquirement of Hydramotive, Inc. In the State of Ohio, Fluid Mechanics will assist equipment and engine distributors and dealers in the sale and installation of Hydrotor systems to meet engine starting requirements. Richard A. Hardy, Vice President of Fluid Mechanics, states his company has moved into a 3500 sq ft facility to better house a complete stock of starter equipment, which will fit all engine makes and models.

Branch Office Promotions

The promotions of Roy W. P. Johnson and Curt J. Havekotte to the respective positions of Assistant New York District Manager and New York Branch Manager, have been announced by George W. Edick, Sales Manager, Domestic Division of The Cooper-Bessemer Corporation, Mount Vernon, Ohio. In his new capacity, Mr. Johnson will assist Mr. C. M. Reagle, New York District Manager, in the development of broader sales markets for the company's products throughout the New York territory. Mr. Havekotte assumes the supervision of the domestic New York office staff and sales force in the direct sales contact of process engineering companies and users of compressors and power engine equipment.

Diesel Jeep For Mines

The *Mighty Mite* of American industry, the Jeep, has gone underground. Converted to diesel power by Waukesha Sales & Service, Inc. of Houston, the Jeep has been approved by the U.S. Bureau of Mines for use in non-coal mines. Approval Number is 2412. Thirty of the diesel Jeeps already are in use in mines in western states. These are doing yeoman service for such firms as National Potash Company, Duval Sulphur and Potash Company, and International Minerals and Chemicals Corporation. Why put a diesel Jeep in a mine? The principal reason is that the diesel engine, in conjunction with an exhaust-gas conditioner, puts out a relatively small amount of carbon monoxide. This is extremely important in mining operations where ventilation can be a problem. Another reason is that the diesel Jeep can be operated quite economically.

The diesel Jeep is available in four-wheel drive for rough passage ways with a choice of 80 in. or 101 in. wheel base. Rear mounted winch can be installed and seats and steering wheels can be lowered to accommodate low mine ceilings. The engine being used in the Jeep is the Waukesha Diesel 180-DLC with Bosch fuel injection pump and heavy duty 12-volt system with glow plugs for easy starting. Exhaust system includes stainless steel scrubber with safety valve to prevent reverse flow of fluid from conditioner to engine. Exhaust gases are diffused by a flow of air from the coolant fan. No special parts are involved in the engine or the Willys Jeep. Clutch, transmission and transfer case, drive shafts, axles—all are furnished as on the standard models. Engine assembly is standard for Waukesha. Thus, there are no problems relative to parts replacements. Principal use of the diesel Jeep in the mines is for transportation of personnel and equipment. Normally, various types of electric vehicles are used. But, with the new Jeep, no electric cables or recharging stations are needed.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, Calif.

Where performance is the measure

F-M Power is the standard

NEW TUG MALIE

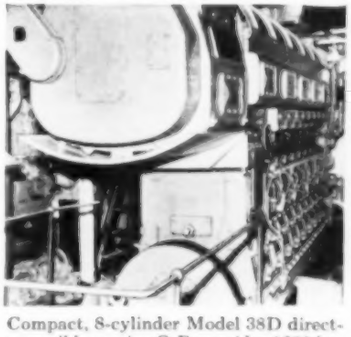
Tug *Malie*, designed by Carl J. Nordstrom, naval architect: built by Albina Engine & Machine Works, Portland, Oregon.

Newest in the Oahu Railway Fleet of Fairbanks-Morse Powered Tugs

One of the biggest vessels built on this Pacific Coast in the past year, the *Malie* is powered by an 8-cylinder Model 38D Fairbanks-Morse direct-reversing marine Opposed-Piston diesel.

Her successful trials show that she has the power, speed and maneuverability to handle the larger ships that now call on Hawaiian ports. Top speed of 13 knots marks the *Malie* as a top performer for her other duties of big-barge towing between Honolulu and Molokai.

Compact power. Speed and maneuverability. Proved low maintenance. These are the design requirements fulfilled in more and more vessels today in all waters—by the most modern of marine diesel engines, the Fairbanks-Morse Opposed-Piston diesel. Determine what O-P performance from 300 to 3000 hp. can do for the vessel you own or are building. Write: Fairbanks, Morse & Co., Chicago 5, Illinois.



Compact, 8-cylinder Model 38D direct-reversible marine O-P provides 1280 hp. of responsive power for the new tug *Malie* of the Oahu Railway fleet.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • MAGNETOS

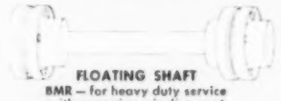
NO LUBRICATION
NO MAINTENANCE
NO WEARING PARTS

Specify
THOMAS
ALL METAL
FLEXIBLE COUPLINGS
FOR MAINTENANCE FREE
POWER TRANSMISSION
on PUMP, COMPRESSOR,
MARINE and
OTHER DRIVES

"TOMALOY"
FLEXIBLE DISC RINGS

DBZ – for high speed, heavy duty drives

Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.



FLOATING SHAFT
BMR – for heavy duty service with excessive misalignment

SINGLE FLEXING
SS – for engine-driven generator sets with out-board bearings

DOUBLE FLEXING
AMR – for engine and medium speed drives

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U. S. A.

High Mileage Diesel Truck

The first of an entirely new group of diesel tractor models is currently being introduced by The White Motor Company to broaden its coverage of the highway transport markets and to provide operators with a truck of high-mileage economy in the heavy duty diesel class. The Cummins NH-180 diesel engine will be standard. This 180 hp naturally aspirated heavy duty engine is developed from the components of the 220 hp NH-220 series except for reduced bore, which changes the displacement from 743 cu in. to 672 cu in. It incorporates the NHB four-valve cylinder head for superior breathing and operates at low exhaust gas temperatures for top economy and peak performance.

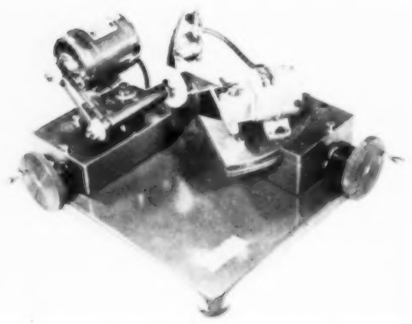
This new NH-180 engine will develop 180 hp operating at 2100 rpm, making it good in fuel economy and well suited for rugged service over all kinds of terrain for today's bigger payloads, assuring operators of longer life before and between engine overhauls and lower operating cost. White's "unit option" model plan insures the operator that whatever special design and operating specifications he needs for his application, all related components will be engineered to do the job with top efficiency. White front and rear axles are furnished. This rugged new unit is engineered for today's power characteristics. In addition to heavy duty, multi-speed single shift lever transmissions, four different chrome manganese steel heat treated frames are available, permitting gross combination weights up to 80,000 lbs over all types of terrain. Wheelbases offered are from 140 in. to 212 in. The 4400TD is available with other diesel engines rated up to 220 hp.

Named Director of Sales

Arthur D. Marks

Arthur D. Marks, manager of the foreign division of Hercules Motors Corporation since 1945, and a former Navy career officer, has been named Director of Sales, it has been announced by William L. Pringle, president. Mr. Marks was born in Washington, D.C., and was graduated from the U. S. Naval Academy at Annapolis in 1927. During the greater part of his Navy career he was identified with submarine commands in Chinese and Hawaiian waters, retiring from active service in 1938. He was recalled to active duty in 1940 and until the end of the war served as assistant head of the Internal Combustion Engine Section of the Bureau of Ships of the Navy. Mr. Marks is a member of the Society of Naval Engineers, American Ordnance Association, Navy League, the Army and Navy Club in Washington and the Brookside and Canton Clubs in Canton.

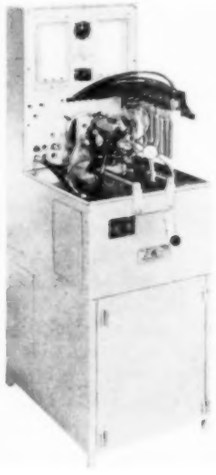
Diesel Nozzle–Valve Grinder



The Federal Machine Tool Co. of Bristol, Connecticut announces the availability of the Federal Diesel Nozzle–Valve Grinder, Model FMT #1, formerly supplied by American Bosch Arma Corp., which carries their approval for reconditioning of nozzle assemblies for diesel engines. The nozzle is driven in a V rest by means of a separate motor to assure absolute concentricity with cone. The grinding head is built to an exacting degree of accuracy guaranteeing the highest degree of micro finish. It can be used with 110 V., ac or dc current. The Diesel Nozzle–Valve Grinder is especially suited for use by Repair Shops that service diesel trucks, Fleet Owners who have their own shops, Utility Repair Shops, Shipyards, Railroads, Transportation Shops, and Builders of diesel engines. More than 300 units are presently in operation throughout the world. Complete information and descriptive bulletin may be obtained from the Federal Machine Tool Co., Emmett St., Bristol, Conn.

ITS NEW

Fuel Pump Test Stands

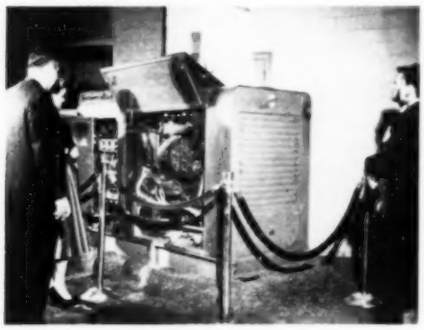


Two diesel fuel pump calibrating stands for testing Roosa Master Pumps are now being offered by Bacharach Industrial Instrument Company. These test stands and accompanying specially engineered

accessories are factory-approved for performing the necessary calibrating tests in accordance with the pump manufacturer's recommendations. Photo shows the SP-600 Stand which is for testing all Roosa Master pumps. This stand, with suitable accessories, may be used for other fuel pumps on smaller diesel engines in trucks, farm tractors, and mobile power units. The other stand, also factory approved for Roosa Master Pumps, is identified as Model GP-500C. It has been designed for maximum versatility and is suitable for testing all fuel injection pumps used in automotive diesel engines including those in heavy duty trucks and construction equipment. For complete particulars, send for Leaflet 933, Bacharach Industrial Instrument Company, 200 N. Braddock Avenue, Pittsburgh 8, Pa. (ITS NEW)

Missiles Rely On Diesel Generator Sets

Houston-manufactured generator sets are being used by the Air Force, Army and Navy to blast off and guide a variety of missiles in this country's stepped up defense preparedness and space conquest programs. The sets are being turned out here at the Harrisburg plant of Stewart & Stevenson Services, Inc. A unit typical of those being used at Cape Canaveral, Florida; Fort Bliss, Texas, Redstone Missile Center, Huntsville, Alabama and on the West Coast, is on display near the entrance to the Hall of Exhibits in the Shamrock Hilton Garage. It is an all-weather 45 kw, 400 cycle set with an electric load sensing governor. Precise power is a prime necessity in missile work. At Fort Bliss, Texas, Stewart & Stevenson generator sets power the radar system which provides a beam on which the *Nike Hercules* hurtles up to its targets. Likewise, on the West Coast, the Houston generators provide radar power for the Marine Corps' *Terrier Missile*.



In connection with missiles such as the *Atlas*, *Navajo* and *Redstone*, which are launched at Cape Canaveral, the Stewart & Stevenson units power missile control guidance systems, provides electricity for radar tracking devices and offer necessary checkout power while the missiles are being readied for launching. For example, the *Atlas* is a ballistics missile and does not rely on ground navigational equipment to get it to its target. However, before launching, certain units within the hull of the 100-ton rocket are powered by generator sets so that stored up energy can be conserved for flight. Also, various testing procedures before blastoff require power. All of this can be generally described as checkout power. Stewart & Stevenson generator sets in use in the missile program incorporate General Motors diesel engines.

Jim Miller, Shepherd Machinery Co.'s General Service Manager, administrates one of the country's largest and most modern heavy equipment repair facilities.

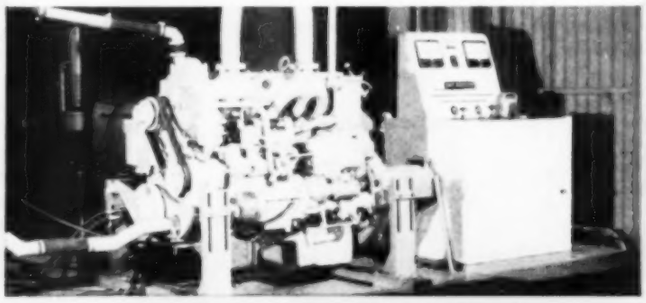
SHEPHERD MACHINERY SAYS:
"With our Clayton Dynamometer we deliver better engine performance... happier customer service– at greater profit!"

Keeping customers happy and coming back to the same place to do business is essential to Jim Miller, General Service Manager of the Shepherd Machinery Company, located in Los Angeles . . . one of the nation's largest dealers in construction machinery, industrial and marine engines.

"With our Clayton Engine Dynamometer—which we purchased in June 1953—we are certain that we're making available to our customers the highest possible standards of service, and at a profit to us.

"A Dynamometer offers many advantages," states Jim Miller, "but most important to us has been the ability to run-in and accurately test all rebuilt engines . . . This has practically eliminated costly warranty field service trips and, of course, vastly improved customer confidence in our workmanship . . . This alone means thousands of dollars a year to any engine distributor."

Let a Clayton representative show you how a Clayton Dynamometer will pay for itself out of savings alone.



FEATURES OF CLAYTON DYNAMOMETERS

- Designed and built for "running-in" rebuilt gasoline and diesel engines.
- Gives complete on the road or job performance data in terms of horsepower or torque and RPM.
- Torque loads are maintained indefinitely or changed at will to fully test any engine.
- Engine adjustments on the stand are simple to make.
- All models handle either right or left hand rotation.

Sirs: Please send us more information on the complete line of Clayton Dynamometers without any obligation to us.

NAME _____ COMPANY _____

ADDRESS _____ CITY _____ STATE _____

OUR BUSINESS IS _____ We handle _____ engine repair jobs a week.

Send to: **Clayton MANUFACTURING COMPANY**
443 NORTH TEMPLE CITY BLVD., EL MONTE, CALIFORNIA

West Coast News

west Territories some four years ago. Halla comes to the Burgess-Manning can be furnished to run as diesel, dual-

Mid-Continent Diesel News

By Jack F. Cozier

PHILLIPS Petroleum Co., Grants, New Mexico, purchased three Chicago Pneumatic 600 cu ft compressors powered with GM diesel engines from R. A. Young & Son, Inc., Tulsa, Okla., for uranium mining in that area.

F. L. GAINES & Son, Miami, Okla., bought a model 720 John Deere diesel tractor for pulling a sheepsfoot roller. The sale was made by Tulsa Equipment Co., Tulsa, Okla.

CITY OF St. Louis, Michigan, has purchased one 12 cylinder, model 38D8⅛, 1920 hp Fairbanks, Morse diesel engine. TEXAS-ARIZONA Motor Freight, Inc., El Paso, Tex., has in operation 14 White WC-24PLTD tractors with Cummins HRFB-600 diesel engines, 14 White Freightliners with Cummins NHHB-600 diesels, and four Kenworth tractors with Cummins NHB-600 engines. These company tractors each cover from 14,000 to 16,000 miles per month.

BERRY Equipment Co., Muskogee, Okla., has bought an International TD-14 tractor with a 14K3 International-Drott front end loader from the Clarence L. Boyd Company sales representative, E. A. Emerick of Muskogee. The unit will be used for excavation work on the expansion of American Airlines turbine maintenance depot.

COHENOUR Construction Co., Ardmore, Okla., purchased a model 44 Lima shovel for road construction work at Havener, Okla. The unit is powered with a GM 471 diesel engine and was bought from R. A. Young & Son, Inc., Tulsa, Okla.

CITIES Service Oil Company, Bartlesville, Okla., bought a 10 cylinder, 750 hp, model 38F5¼ Fairbanks, Morse diesel stationary engine.

MIXON Brothers, Idabell, Okla., purchased a Cummins 175 hp model JT-6-B diesel engine from Cummins Sales & Service, Inc., Fort Worth, Tex.

SOBER Brothers, Ponca City, Okla., are using a model 820 John Deere diesel tractor purchased from Tulsa Equipment Co., Tulsa, Okla. The unit is pulling a Hancock scraper.

H. L. BROWNIE Choate, Alice, Tex., operates ten West Coast International Tandem RD-305 and Mack B-83 tractors, all powered with Cummins NHB-600 diesel engines for oil field trucking operations in South Texas.

District Office

The De Laval Separator Company, Chicago, Illinois, has announced the opening of a new district office in Minneapolis, Minnesota. Mr. Don E. Hutson will be in charge of operations. Complete sales and engineering facilities for De Laval centrifugal and plate heat exchanger equipment will be made available from the office to serve the chemical processing, food processing, power and metal-working industries in the Minneapolis-St. Paul area.

Sales Department Changes

Major personnel changes in the Sales Department of American Bosch Division of American Bosch Arma Corporation, located in Springfield, Mass., were announced recently by C. W. Perelle, president. Harold R. Sennstrom, Vice President - Engineering, has assumed the additional responsibility for all Division sales operations and has been appointed Vice President - Engineering and Sales. J. H. Flaskamper, formerly manager and Vice President - Sales, has been named Staff Assistant in charge of special assignments to Sidney E. Miller, Vice President and Division Manager. Bert Cole, Director of Marketing and Distribution - Commercial Products, for American Bosch Arma Corporation, will also serve temporarily as acting General Sales Manager of the Division. Sennstrom joined American Bosch in 1955 as Vice President - Product Development. A graduate of Purdue, he was formerly with American Locomotive Co. (now Alco Products, Inc.) where he spent fourteen years in various engineering and sales positions. Stanley M. Terry, Assistant Manager of Engineering-Electrical Products, has been elevated to the post of Manager of Engineering.

DC Motor and Generator Line

Marathon Electric of Wausau, Wisconsin, is now offering a new line of dc motors and generators with frame sizes from 180 through 586. A prime feature of the new line is that the dc motors are interchangeable, rating for rating, with corresponding NEMA ac induction motors. The new motor line ranges from ½ to 200 hp, ¾ to 200 kw, operate at a continuous 60°C rise, and are equipped with full Class B insulation. For complete information, request special DC Bulletin No. SB-182, Marathon Electric Mfg. Corporation, Wausau, Wisconsin.

ITS NEW

Project Engineer

The appointment of Sam McCleneghan as a Project Engineer by Stewart & Stevenson Services, Inc. has been announced by Joe Manning, Vice President and General Manager. Mr. McCleneghan attended Utah State College and the New Mexico Military Academy. He was one of the founders of the Valley Manufacturing Company in Valley, Nebraska and was associated with that company for 17½ years prior to joining Stewart & Stevenson. With Valley, Mr. McCleneghan helped develop a new type farm elevator, a pulverizing tool and perfected an inexpensive U joint and slip clutch for low speed farm applications. He helped set up manufacturing and marketing systems for the Self-Propelled line of irrigation equipment. Mr. and Mrs. McCleneghan live in Dickinson near Houston, Stewart & Stevenson headquarters. They have two sons.

Standardized Load Bank Line

A completely new line of standardized load banks for obtaining artificial electrical loads has been announced by Ward Leonard Electric Co. With Ward Leonard's concept in load bank design the purchasing engineer is offered a wide range of loading resistors and switch selection in combination with standard size enclosures and mountings. Each load bank consists of a metal framework; pre-wired resistance elements; terminals for external connection and load section switching components where needed. Elements are Ribflex or Barohm ribbon type resistors.

Recommended for use by testing labs, and engine manufacturers, these load banks are available in capacities up to 70 kw per unit, 600 volts max. Multiple units may be combined where higher capacities are required. Complete technical information on this new Standardized load Bank Line is given in Bulletin 39 and the 4-page Data and Price Guide supplement, available on request from Ward Leonard Electric Co., Mount Vernon, N. Y.

ITS NEW

Alarm and Control Unit

New important features and alarm sequences are now being offered with this new annunciator which monitors any process or plant variable. Electro-Pane uses a conservative design of powerful coil operated mercury switches. Additional mercury switches combined with mechanical tripping latch action allow alarm units to be used directly in control, thereby eliminating relay circuits.

Now included are individual pull out units which when disengaged completely isolates external sensing contacts simplifying the process of checking for grounds. Individual units can be completely disassembled and inspected in the field. The new sequence is as follows: Alarm Conditions—Flashing (any color). Acknowledge—Steady (same color). Clear—Steady (different color). The Clear feature is optional and units can be furnished to automatically return to normal. Earlier models have been used in Power, Process, Chemical, Petroleum, Paper, Steel, Aircraft, Glass, and Cement Industries. For more information write Electro Devices Inc., 116 S. Michigan Ave., Chicago 3, Ill.

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In the Kato line there is a generator in the size and with electrical characteristics to meet your specific requirements. By means of one of Kato's flexible steel disc type or bonded rubber couplings, Kato Generators adapt to all engines with S. A. E. Bell Housings. Easily connected to any gasoline or diesel engine. Standard frequencies—25, 50, 60, and 400 cycles plus many special frequencies to 1200 cycles, both fixed and variable. 400 cps to 250 KVA; 60 cps to 500 KVA. Single, standard, two bearing or two bearing close-coupled design. Orders for special generators to fill special needs or uses are welcomed.

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* Input 60 Cycles
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MOTOR GENERATOR SETS

Wide variety of both fixed and variable frequency ranges starting at 25 cycles . . . up to 1200 cps. 400 cycle line to 250 KW.

West Coast News

By James Joseph

TO JOHN C. Whittaker, Los Angeles, a Cummins NT 250 hp engine for a Kenworth KLJ 825C truck.

SOLD TO Northwest Marine Iron Works for the dredge *Pacific*, Portland, Oregon, an 8 cylinder model 38F5¼ Fairbanks-Morse diesel.

ANOTHER Fairbanks-Morse engine—a model 49, 126 hp—has gone to San Francisco's Western-Knapp Engineering Co.

DON MELTON, Gold Beach, Oregon, has repowered a BU-85 Skagit logging machine with an Allis-Chalmers Model 6DA-844 diesel. Skagit has a standard 4-speed transmission.

SWEET HOME, Oregon's Suttle Lake Logging Co. has purchased a 60 kw model 6DAG-844 at 1200 rpm Allis-Chalmers diesel with Century generator, radiator cooled, for around-clock powering of logging camp in Willamette range.

POWERING a Mack LJSW rig is a Cummins 220 hp NHB diesel engine for Weyerhauser Timber Co.'s North Bend, Oregon, operations.

GEORGE Wingie, Granite Falls, Wash., has taken delivery of a Cummins 220 hp NH engine for his Peterbilt rig, sale via Cummins Diesel Sales of Washington, Inc.

SOLD TO Albany, Calif's Moffett Engineering Inc., two Fairbanks-Morse model 49 diesel units, with total of 252 hp.

FOR MENASHA Plywood Co., North Bend, Oregon, two HD-21 crawler tractors powered with Allis-Chalmers turbocharged diesels, and sale via Hamilton Engine Sales, Inc., Portland.

HAUPERT Tractor Co., Medford, Oregon, reports sale of six Allis-Chalmers HD-16 crawler tractors in Medford area, all powered with Allis-Chalmers diesel engines.

TO POTLATCH Forests, Inc., Bovill, Idaho, as part of a continuation program the repowering of three off-highway logging trucks with Allis-Chalmers model 6DS-844 engines, rated 280 hp at 2100 rpm.

DOZERS, most of them Caterpillar, are criss-crossing Canada's far-northern oil lands with access roads in the north country's biggest "opening-up" program since oil exploration began in Northwest Territories some four years ago. Among the operators: Union Oil, California Standard Co., Mobilgas and Shell.

TO RAWLINS, Wyoming's Neuman Transit Co., a Cummins NH 6-B diesel for installation in company's Kenworth 825; sale by Cummins Diesel Sales Corp., Denver.

A 220 HP Cummins NHB diesel has gone into a Kenworth rig operated by Portland, Oregon's P and A Refrigerated Express Co.

TO ALBANY, California's Moffett Engineering Inc., two model 48 diesel generating sets from Fairbanks-Morse.

FOR CONNELLY Pacific Co., Long Beach, Calif., a Cummins NHRBIS diesel for repowering the company's Euclid 29 TD.

DELIVERED: three 8 cylinder Model 38F5¼ Fairbanks-Morse marine diesels to Portland's Northwest Marine Iron Works.

HULT Lumber Co., Junction City, Oregon, has repowered its BX-200 Skagit yarder with an Allis-Chalmers model 6DS-844 diesel. The unit has hydraulic start and Gearmatic transmission keyed to 24 cu ft air compressor.

GM Distributor

The GM Detroit Diesel Engine Division has named Williams & Lane, Inc. of Berkeley, as new distributor of General Motors two-cycle diesel engines in the San Francisco Bay and Northern California area. The company is a new corporation formed to handle the Detroit Division's line of industrial, marine and truck diesels exclusively. The business is located in Berkeley at 1077 Eastshore Highway where complete parts and service facilities have been established. Heading the new company is James R. Williams, president; N. L. Lane, vice president; and W. M. Glade, treasurer. All are well known in the diesel industry and bring to the new company a wide experience in the application and service of GM diesel engines.

Burgess-Manning Sales Appointments

W. A. Carroll, General Sales Manager of the Burgess-Manning Company, Industrial Silencer Division, has announced the assignment of J. A. Kolb as Sales Engineer in the New York District Office and the appointment of Louis G. Halla as Sales Engineer to complement the staff in the Chicago District Office. Jack Kolb is well known in the Chicago area where he has served as Field Sales Engineer for the past three years. Louis G. Halla comes to the Burgess-Manning Company with a broad experience in the fields he will now serve. He is a registered professional engineer and a graduate of the University of Illinois with a Bachelor of Science degree in Civil Engineering. His past associations include the Walker Process Equipment, Inc., and Wallace & Tiernan, Inc.

Irrigation Engines Bulletin

The Allis-Chalmers line of irrigation engines is discussed in a new 8-page catalog now available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Catalog views and cutaways of the various power units; pictures of important engine components, engine horsepower graphs, photographs of the units in action, and specifications, illustrate the new catalog.

Pipeline Diesel Bulletin

Bulletin #116, a brief summary of the company's line of Superior diesel, gas, and dual-fuel engines with applications in the petroleum pipe line industry, has recently been issued by the White Diesel Engine Division of The White Motor Company. The four-page, two-color catalog lists 19 models of six basic engines to meet a variety of pipe line power requirements. All are of four-cycle vertical in-line design, available with six or eight cylinders and either naturally aspirated or supercharged, intended for slow or medium speeds. Ranging from 190 to 2150 bhp, the conservatively rated units can be furnished to run as diesel, dual-fuel, or gas engines, and they are also available in engine-generator sets of from 150 to 1500 kw. Product and in-use photos, dimensions, and specifications are included in Bulletin #116, along with national sales and service locations. Complimentary copies available from Harry Clark, Adv. Mgr., White Diesel Engine Div., Springfield, Ohio.

Generator Units For Corps of Engineers

The U. S. Corps of Engineers of Berryville, Virginia has purchased four 1250 kva, 1,000 kw, 600 rpm, 3-phase, 60 cycle, 2400 volt, diesel driven Electric Machinery generators. The generators will be of dripproof protected construction. Driving the generators will be four Baldwin-Lima-Hamilton diesel engines. The installation will be completed in late 1958.

Director of Sales Promotion

W. J. Klein, a vice president of Allis-Chalmers Mfg. Company, is now director of sales promotion, Tractor Group. Klein was director of sales, Tractor Group. He will now direct the advertising, sales promotion and marketing activities for the products of the Farm Equipment, Construction Machinery, and Engine-Material Handling Divisions. R. L. Smith has been named manager of advertising for the three divisions in the Tractor Group. He has been radio director for the Group since 1948.

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A barge line operator writes about DIESEL ENGINE CATALOG, Volume 22 . . . "The thing that impressed me most was the simple manner in which the material is presented. This is essential for most of our operating people, and as a result, they constantly refer to it."

An application engineer writes . . . "I find the Catalog interesting from an Engineering standpoint, first in which I can compare various design features of the multitude of engines offered in the diesel field. During the year, it is especially valuable as a reference when reviewing various new jobs and installation work, or in proposal work along the sales line."

A naval architect writes . . . "I consider this Catalog one of the outstanding books of its kind published in this country. It is kept in our drafting room, and in writing specifications or looking up materials to be incorporated in my design of tugs, fireboats, and other floating equipment, the drafting room always uses it as a reference book."

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Volume Twenty-Two

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Diesels Reduce Operating Costs

A fleet of diesel-powered tractors has helped the Wilson Grain and Elevator Company reduce costs in its operations throughout the Midwest and South. Donald L. Wilson is owner of this fleet, whose home base is Riverdale, Kansas and which operates from South Dakota to Louisiana. The fleet hauls grains, produce petroleum products, sugar, and general freight. With the hope of reducing costs, Wilson gave diesels a trial in early 1957, purchasing 12 White 9000 tractors powered by Cummins JT-6-B Turbodiesel engines. His new diesel tractors showed such marked economies

over the gasoline-powered units in his fleet that he made two successive diesel purchases and within nine months had a fleet of 33 Cummins-powered White 9000s. Wilson's records on the diesels show an average of 6.9 miles per gallon of fuel and an overall saving of 12 cents a mile over his gasoline-powered trucks. "The economies made possible by the Cummins JT have more than paid for the new units I have added to my fleet," said Wilson. "My drivers are pleased with the power and performance of our diesel trucks." Wilson Grain and Elevator now has a total of 38 diesel tractors operating in South Dakota, Nebraska, Kansas, Iowa, Minnesota, Missouri, Oklahoma, Texas, Arkansas, Mississippi, and Louisiana. Gross receipts in 1956 were $3,235,680.

Oil Field Division Manager

W. S. Johnson

V. H. Peterson, Vice President—Sales, Fairbanks, Morse & Co., has announced the retirement of Harry J. Renken, Manager of the Oil Field Division, and the appointment of W. S. Johnson for that same position. Mr. Renken originally came to Fairbanks, Morse & Co. in 1915 and has a long and successful service with the organization. He was for many years also Manager of the company's Dallas, Texas Branch. W. S. Johnson has been for a number of years Manager of the Diesel Department of the Dallas Branch until his recent appointment to Manager of the Oil Field Division with headquarters in Chicago.

Cab-Forward Truck

Development of a versatile new cab-forward type truck, featuring several engineering advances, has been announced by Mack Trucks, Inc. It is adaptable both for light and heavy hauling in the city or over the road. P. O. Peterson, Mack president, said the new cab-forward models will be produced for use either as four or six wheel trucks or trac-

tors, and will be available with either gasoline or diesel engines. E. G. Ewell, vice president-sales, added that the new vehicle will be one of the first cab-forward type with set-back front axle capable of accommodating a diesel engine over 200 hp.

The new line, designated the N-Group, is divided into two series. The 40-Series, for lighter hauling, registers a maximum gross vehicle weight of 28,000 lbs. and a gross combination weight on tractors of 40,000 to 53,000 lbs. The 60-Series, for heavier work, has a maximum gross vehicle weight of 30,000 lbs. and a gross combination weight rating on tractors of 50,000 to 65,000 lbs.

For fast easy servicing, the vehicle uses the tilting principle in which a spring balance arrangement allows the entire cab to be tilted forward and returned to position by a touch of the hand. Positive safety locks are provided to secure the cab firmly in both raised and bedded position. In tilting the cab, it is unnecessary to disconnect instruments or controls since these are all electrical.

Other features include dual headlights, a range of transmissions covering 5, 10, 15 and 20 speeds, and a choice of either single reduction or dual reduction rear axles. Mack Thermodyne diesels of 170 and 205 hp are featured in these models.

Off-Road Log Hauler

A mammoth new log hauler, designed specifically for travel over rough undeveloped trails, was introduced to the United States recently by R. G. LeTourneau, Inc., of Longview, Texas. Vice President R. L. LeTourneau noted that the first such haulers manufactured by his company already have been thoroughly proved in hauling 30-ton loads of mahogany over rough mud trails in the Philippines. Also he noted that similar machines by his company have met with success in hauling other types of materials in sections throughout the world during the past year. Like all LeTourneau logging equipment, the new Series T Transporter has dc electric motors geared directly to each individual wheel. Also it has electrically-powered steering plus a single electric control for speed, power, and braking. Because all power is from electric motors geared directly to points where power is needed, the machine has no clutches, drive shafts, or other mechanical drives. Also the use of wide-base, low pressure tires makes it unnecessary to use springs of any type between the bunks and axles.

General Specifications

Overall length	45′ 8″
Overall width	14′ 0″
Overall height	13′ 2″
Bunk width	14′ 0″
Cab guard to rear bunk support	31′10″
Wheelbase	32′ 0″
Gauge	9′ 7″
Minimum width for non-stop 180° turn	76′ 6″
Tires	Six 73″ O.D. wide base tubeless
Travel speed, forward or reverse	Infinite range, 0 to 16 mph
Weight, equipped as illustrated	60,800 lbs.
Gross capacity (includes bunks and accessory equipment)	35 tons

Mechanical Data

Power-Source: 335 hp Cummins NRTO-6-BI diesel engine drives directly-coupled LeTourneau generators.

Power Application: LeTourneau electric motors located at points of power application, including dc motors driving each wheel individually.

Steering: Front axle electrically steered.

Brakes: Regenerative electric braking for operational purposes and magnetically controlled, multiple-disc brakes for emergency stops and parking.

Controls: Single electric control governs speed, power, and braking. All other functions controlled by finger-tip electric switches.

For further information on the logging Transporters, write to: R. G. LeTourneau, Inc., 2399 South MacArthur, Longview, Texas.

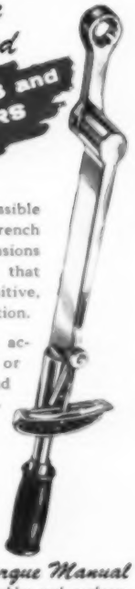
55 Foot Crewboat

George Engine Company, GM diesel engines distributors on the Harvey Canal, Louisiana, has recently announced that a new Sewart Seacraft crewboat has been sold by George Engine Company to a major drilling contractor for their overseas operations. According to H. F. Colby, Executive Vice-President and General Manager of George Engine, the new Sewarts are new, big and fast. Mr. Colby went on to say, "They have a top speed of 25 miles per hour plus a cruising speed of 22 miles per hour plus loaded".

Shown in the photo above is one of the new Sewarts in action. Fifty-five ft long, they are twin screw, with 600 shp of GM diesel engines. Other outstanding features include ample crew accommodations, a high pilot house for added visibility, passenger accommodations of the highest quality, plus deck space for light cargo.

Only **ONE** *Torque Wrench can be accurately used with . . .*

EXTENSIONS and ADAPTERS



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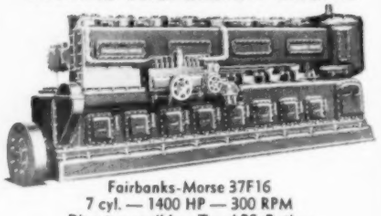

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Maybe *you'll soon have this decision to make*

LUBRICATION CASE STORY ON THE NEW WORTHINGTON AT INDEPENDENCE, IOWA

Situation: Gene Williamson, plant superintendent, had a decision to make when the Independence, Iowa, Municipal Light Plant installed a new 3600 Horsepower Dual-Fuel Worthington last year. What lubricating oil to use? Other equipment in the plant was lubricated with STANODIESEL Oil M. Performance was excellent. Lubrication technical service performed by men with experience and training for the job likewise was excellent.

What was done: The decision was made to install STANODIESEL Oil M. Now after 3,780 hours of operation, there are no regrets. There are no signs of wear.

STANODIESEL Oil M is refined from the finest-quality base stock. Additives help the oil resist viscosity change, keep engine parts clean. Other additives control foam, make it possible for oil to reach and hold protective film on even the most difficult to lubricate parts.

What you can do: Get all the facts about STANODIESEL Oil M from your Standard Oil lubrication specialist. There's one near you in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

Quick facts about

STANODIESEL OIL M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult to lubricate parts.
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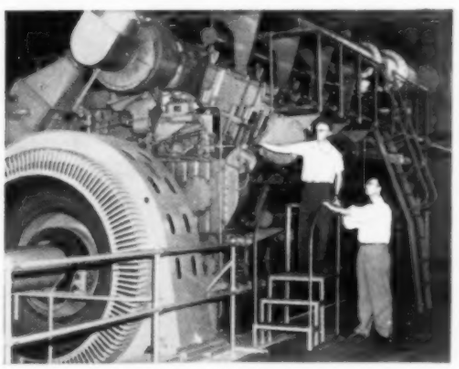

Running smoothly, Gene Williamson, power plant superintendent, and Standard Oil's Bob Wenger (right) check over new Worthington Dual-Fuel engine. Good lubrication technical service is one of the reasons Williamson decided upon STANODIESEL Oil M when engine was installed. Bob Wenger is well qualified by both experience and training to provide such technical service. He has been doing this work for nine years. In addition, he has an engineering degree from Iowa State and has completed the Standard Oil Sales Engineering School.

Mammoth engine room of the "John H. Shary" showing Cooper-Bessemer unit rated 4000 hp at 345 rpm. Another 1475 hp Cooper-Bessemer supplies auxiliary power.

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Constructed in 1924 . . . repowered, remodeled and renamed in 1957 . . . the "John H. Shary", owned by Bauer-Smith Dredging Co., is now one of the country's most efficient and powerful dredging units.

With a new 16-cylinder, 4000 hp Cooper-Bessemer diesel, the "Shary" is able to quickly and easily work through everything from softest mud to hardest rock.

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